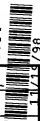


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<b>UTILITY PATENT APPLICATION TRANSMITTAL</b> <small>(Only for new nonprovisional applications under 37 CFR 1.53(b))</small>	Attorney Docket No.	0557-4524-2
	First Inventor or Application Identifier	Nobuaki TOMIDOKORO, et al.
	Title	IMAGE FORMING DEVICE MANAGEMENT SYSTEM

<b>APPLICATION ELEMENTS</b> <small>See MPEP chapter 600 concerning utility patent application contents</small>	<b>ADDRESS TO:</b> Assistant Commissioner for Patents Box Patent Application Washington, DC 20231
1. <input checked="" type="checkbox"/> See Transmittal Form (e.g. PTO/SB/17) <small>Submit an original and a duplicate for fee processing)</small> 2. <input checked="" type="checkbox"/> Specification Total Pages <b>164</b> 3. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) Total Sheets <b>70</b> 4. <input type="checkbox"/> Oath or Declaration Total Pages <input type="text"/> a. <input type="checkbox"/> Newly executed (original or copy) b. <input type="checkbox"/> Copy from a prior application (37 C.F.R. §1.63(d)) i. <input type="checkbox"/> <b>DELETION OF INVENTOR(S)</b> Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §1.63(d)(2) and 1.33(b). 5. <input type="checkbox"/> Incorporation By Reference (usable if box 4B is checked) The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4B, is considered to be part of the disclosure of the accompanying application and is hereby incorporated by reference therein.	<b>ACCOMPANYING APPLICATION PARTS</b> 6. <input type="checkbox"/> Assignment Papers (cover sheet & document(s)) 7. <input type="checkbox"/> 37 C.F.R. §3.73(b) Statement <input type="checkbox"/> Power of Attorney (when there is an assignee) 8. <input type="checkbox"/> English Translation Document (if applicable) 9. <input checked="" type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input checked="" type="checkbox"/> Copies of IDS Citations (4) 10. <input type="checkbox"/> Preliminary Amendment 11. <input checked="" type="checkbox"/> White Advance Serial No. Postcard 12. <input type="checkbox"/> Small Entity Statement(s) <input type="checkbox"/> Statement filed in prior application, Status still proper and desired. 13. <input type="checkbox"/> Certified Copy of Priority Document(s) (if foreign priority is claimed) 14. <input checked="" type="checkbox"/> Other: Notice of Priority, List of Inventors' Names and Addresses, List of Related Cases, Statement of Relevancy
15. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below: <input type="checkbox"/> Continuation <input type="checkbox"/> Divisional <input type="checkbox"/> Continuation-in-part (CIP) of prior application no.: Prior application information: Examiner: Group Art Unit:	
16. Amend the specification by inserting before the first line the sentence: <input type="checkbox"/> This application is a <input type="checkbox"/> Continuation <input type="checkbox"/> Division <input type="checkbox"/> Continuation-in-part (CIP) of application Serial No. Filed on <input type="checkbox"/> This application claims priority of provisional application Serial No. Filed	
<b>17. CORRESPONDENCE ADDRESS</b> OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. FOURTH FLOOR 1755 JEFFERSON DAVIS HIGHWAY ARLINGTON, VIRGINIA 22202 (703) 413-3000 FACSIMILE: (703) 413-2220	

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTOR(S) Nobuaki TOMIDOKORO, et al.

SERIAL NO: New Application

FILING DATE: Herewith

FOR: IMAGE FORMING DEVICE MANAGEMENT SYSTEM

FEE TRANSMITTAL


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FOR	NUMBER FILED	NUMBER EXTRA	RATE	CALCULATIONS
TOTAL CLAIMS	29 - 20 =	9	× \$18 =	\$162.00
INDEPENDENT CLAIMS	8 - 3 =	5	× \$78 =	\$390.00
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIMS (If applicable)			+ \$260 =	\$0.00
<input checked="" type="checkbox"/> LATE FILING OF DECLARATION			+ \$130 =	\$130.00
BASIC FEE				\$760.00
TOTAL OF ABOVE CALCULATIONS				\$1,442.00
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Respectfully Submitted,

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN RE APPLICATION OF: Nobuaki TOMIDOKORO, et al.

FILING DATE: Herewith

FOR: IMAGE FORMING DEVICE MANAGEMENT SYSTEM

**LIST OF INVENTORS' NAMES AND ADDRESSES**

ASSISTANT COMMISSIONER FOR PATENTS  
WASHINGTON, D.C. 20231

SIR:

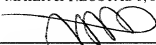
Listed below are the names and addresses of the inventors for the above-identified patent application.

Nobuaki TOMIDOKORO	Yokohama-shi, Japan
Tetsuo ASAKAWA	Tokyo, Japan
Shohzoh MIYAWAKI	Urawa-shi, Japan
Hiroshi NISHIDA	Yokohama-shi, Japan

A declaration containing all the necessary information will be submitted at a later date.

Respectfully Submitted,

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SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT WE, NOBUAKI TOMIDOKORO, a citizen of Japan residing at Kanagawa, Japan, TETSUO ASAKAWA, a citizen of Japan residing at Tokyo, Japan, SHOHZO MIYAWAKI, a citizen of Japan residing at Saitama, Japan and HIROSHI NISHIDA, a citizen of Japan residing at Kanagawa, Japan have invented certain new and useful improvements in

IMAGE FORMING DEVICE MANAGEMENT SYSTEM

of which the following is a specification:-

1     BACKGROUND OF THE INVENTION

          (1) Field of the Invention

          The present invention relates to an image  
forming device management system in which a plurality of  
5     image forming devices, such as copiers, facsimiles, or  
printers, are linked through a communication device to a  
central service station, and each image forming device can  
automatically transmit a message to the central service  
station while the image forming devices can be remotely  
10    controlled by the central service station.

          (2) Description of the Related Art

          As disclosed in Japanese Laid-Open Patent  
Application Nos. 8-116399, 6-329298 and 8-331355, there is  
known an image forming device management system in which a  
15    plurality of image forming devices are linked through a  
communication device to a central service station.

          Japanese Laid-Open Patent Application No.  
8-116399 discloses a system in which a plurality of image  
forming devices connected to a communication control unit  
20    via a signal line, located on a user site, are linked to a  
central service station at a remote location through a  
communication network.

          In the system of the above publication,  
when the signal line between the image forming device and  
25    the communication control unit is in a disconnected state,

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1 the central service station is unable to communicate with  
the image forming device. Hence, as the central service  
station is unable to detect whether the image forming  
device is in a disconnected state, it is difficult for the  
5 central service station to speedily provide a maintenance  
service for the image forming device during its  
disconnected state.

Japanese Laid-Open Patent Application No.  
6-329298 discloses an image forming device maintenance  
10 system in which, when a jam of an image forming device (or  
a copier) occurs, a determination as to whether the copier  
requires a maintenance service is made on the side of the  
copier based on its troubled condition. If it is  
determined that the maintenance service is required, the  
15 copier automatically transmits a service request to a  
central service station via a communication device.  
According to the system of the above publication, when the  
service request from the copier is received by the central  
service station, it is possible to have a serviceman  
20 speedily visit the user site and properly recover the  
troubled condition of the copier.

In the system of the above publication,  
every time the determination that the maintenance service  
of the copier is required is made, the service request is  
25 automatically transmitted from the copier to the central

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1 service station. For example, when a jam of the copier  
frequently occurs, the automatic service request  
transmission and receiving must be repeated many times by  
the system of the above publication. Hence, the system of  
5 the above publication is likely to be in a situation that  
the automatic service request transmission and receiving  
is performed too many times although it is not necessary.

Japanese Laid-Open Patent Application No.

8-331355 discloses a method of automatically transmitting  
10 a maintenance service start message and a maintenance  
service end message from an image forming device on a user  
site to a central service station at a remote location  
when a maintenance service of the image forming device on  
the user site is initiated and terminated by a serviceman.

15                    However, it is difficult for the method of  
the above publication to carry out an automatic message  
transmission of the image forming device in an appropriate  
situation during the maintenance operation of the image  
forming device by the serviceman.

20 In addition to the maintenance service  
start/end messages, there are other messages which should  
be automatically transmitted to the central service  
station even during the maintenance service of the image  
forming device (or the copier). For example, when a lack  
25 of replenishment parts, such as toner, occurs, it is

1 desirable to automatically transmit a replenishment part  
supply request from the copier to the central service  
station even during the maintenance service of the copier.  
Further, there are further messages which should not be  
5 automatically transmitted to the central service station  
during the maintenance service of the copier. For  
example, when a certain error of the copier occurs after  
the start of the maintenance service of the copier, it is  
undesirable to automatically transit its error message  
10 from the copier to the central service station because the  
serviceman has already visited the user site. Hence,  
there is a demand for an image forming device maintenance  
system which starts an automatic message transmission only  
in an appropriate situation when a maintenance operation  
15 of the copier is performed by a serviceman.

Further, statistical data of the copier  
related to its troubled condition may be changed during a  
maintenance service by a serviceman, and it is necessary  
to reset the statistical data of the copier at the end of  
20 the maintenance service. If it is not reset, the copier  
may erroneously transmit an error message to the central  
service station, because of the changed data, after the  
maintenance service of the copier.

Further, as disclosed in Japanese Laid-Open  
25 Patent Application No. 5-276260, there is known a

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1 facsimile management system in which a facsimile is linked  
to a central service station (or a communication  
terminal), and the central service station can write  
information to or read information from operating  
5 parameters retained in an internal memory of the  
facsimile. When accessing the internal memory of the  
facsimile, it is necessary to designate an absolute  
address of the internal memory at which an operating  
parameter is retained.

10 Similar to the facsimile management system  
of the above type, there is known an image forming device  
management system in which a plurality of image forming  
devices, such as copiers, connected to a communication  
device on a user site, such as a customer office, are  
15 linked through a public switched network to a central  
service station at a remote location, such as a sales or  
service location.

The above-described image forming device  
management system is intended to efficiently and speedily  
20 provide a service for the image forming devices by  
carrying out (1) a communication control of the central  
service station to the image forming devices, (2) a  
communication control of each of the image forming devices  
to the central service station, and (3) a control of the  
25 communication device by itself.

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1           Further, there is known an image forming  
device management system having a block billing function.  
The block billing function is provided for the image  
forming device management system to establish a charge for  
5   a predetermined number of copy sheets as a contract for  
use of an image forming device.

          However, it is difficult for the above-  
described image forming device management to provide an  
efficient operation of the block billing function or a  
10   precise management of the image forming devices. It is  
difficult to provide an easy-to-use image forming device  
management system for the user.

          For example, there are various kinds of  
image forming devices which are connected to an image  
15   forming device management system having a block billing  
function. An address of the memory of each of the image  
forming devices for retaining an operating parameter is  
different from one another if the image forming devices  
are of different models or of different versions.

20           In the image forming device management  
system, such as that of Japanese Laid-Open Patent  
Application No. 5-276260 mentioned above, it is necessary  
to designate an absolute address of the memory of one  
image forming device (at which an operating parameter is  
25   retained) when accessing the memory of the image forming

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1 device. However, if the image forming devices connected  
to the system are of different kinds, then it is necessary  
to deal with individual absolute addresses of the memory  
for each of different kinds of image forming devices. In  
5 this case, the management method for such image forming  
devices will be considerably complicated. This makes it  
difficult to take actions to upgrade the image forming  
device management system.

Further, there is known an image forming  
10 device management system in which a maintenance service  
start message and a maintenance service end message are  
transmitted from an image forming device to a central  
service station when a message transmit operation is  
manually performed by a serviceman at the start and the  
15 end of the maintenance service of the image forming  
device. In the above-described system, the message  
transmission control is carried out when a service  
program, stored in the image forming device, is executed.

However, if the serviceman fails to perform  
20 the message transmit operation, the central service  
station does not receive the maintenance service start/end  
messages. In such a case, the central service station  
does not recognize a time the maintenance service of the  
image forming device is initiated or terminated by the  
25 serviceman. Hence, it is likely that the above-described

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1 system cannot provide a precise management of the image  
forming devices.

SUMMARY OF THE INVENTION

5 A first object of the present invention is  
to provide an image forming device management system which  
speedily provides a maintenance message for a user of one  
of image forming devices when a separation of a signal  
line between a communication control unit and the image  
10 forming device is detected.

A second object of the present invention is  
to provide an image forming device management system which  
effectively inhibits an automatic message transmission  
from one of a plurality of image forming devices to a  
15 central service station when a jam of the image forming  
device or the like occurs.

A third object of the present invention is  
to provide an image forming device management system which  
starts an automatic message transmission only in an  
20 appropriate situation when a maintenance service of an  
image forming device is performed by a serviceman.

A fourth object of the present invention is  
to provide an image forming device management system which  
efficiently carries out a block billing function.

25 A fifth object of the present invention is

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1 to provide an image forming device management system which  
provides a precise management of image forming devices by  
performing a block billing function in a simple manner.

A sixth object of the present invention is  
5 to provide an image forming device management system which  
provides an easy-to-use management operation for the user.

A seventh object of the present invention  
is to provide an image forming device management system  
which provides a simple management scheme for a central  
10 service station and need not deal with individual absolute  
addresses of the memory for each of different kinds of  
image forming devices.

An eighth object of the present invention  
is to provide an image forming device management system  
15 which is able to manage an accurate time of a start or an  
end of a maintenance service of each of image forming  
devices.

The above-mentioned first object of the  
present invention is achieved by an image forming device  
20 management system which includes a plurality of image  
forming devices, a central service station which provides  
a maintenance service for the image forming devices, and a  
communication control unit which is connected to each of  
the image forming devices by a signal line, the  
25 communication control unit connecting one of the image

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1 forming devices to the central service station via a  
communication network, wherein each of the image forming  
devices includes a message unit which outputs a signal  
line separation message when the image forming device has  
5 no signal from the central service station or the  
communication control unit over a predetermined period.

According to the present invention, when  
the image forming device of concern does not receive a  
signal from the central service station or the  
10 communication control unit over the predetermined period,  
the image forming device outputs the signal line  
separation message. This allows the user of the image  
forming device to recognize a separation of the signal  
line between the image forming device and the  
15 communication control unit. Hence, it is possible for the  
image forming device management system of the present  
invention to speedily provide a maintenance message for  
the user of the image forming device when a separation of  
a signal line between the image forming device and the  
20 communication control unit occurs.

The above-mentioned second object of the  
present invention is achieved by an image forming device  
management system which includes a plurality of image  
forming devices, a central service station which provides  
25 a maintenance service for the image forming devices, and a

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1 communication control unit connected to each of the image  
forming devices, the communication control unit connecting  
one of the image forming devices to the central service  
station via a communication network, wherein each of the  
5 image forming devices includes: a jam detection unit which  
detects a jam of the image forming device; an image  
formation detection unit which detects a normal end of  
image formation by the image forming device; a remote  
message unit which transmits a first remote message  
10 through the communication control unit to the central  
service station, the first remote message indicating that  
the jam of the image forming device is continuously  
detected for a predetermined number of copy sheets before  
the normal end of image formation by the image forming  
15 device is detected; and a remote message inhibition unit  
which inhibits the remote message unit from transmitting a  
subsequent remote message after the transmission of the  
first remote message until the normal end of image  
formation by the image forming device is detected.

20 According to the present invention, the  
remote message inhibition unit inhibits the automatic  
message transmission until the normal end of image  
formation is detected. It is possible to effectively  
inhibits the automatic message transmission from the image  
25 forming device to the central service station when a jam

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1 of the image forming device occurs.

The above-mentioned second object of the present invention is achieved by an image forming device management system which includes a plurality of image forming devices, a central service station which provides a maintenance service for the image forming devices, and a communication control unit connected to each of the image forming devices, the communication control unit connecting one of the image forming devices to the central service station via a communication network, wherein each of the image forming devices includes: a jam detection unit which detects a jam of the image forming device; an image formation detection unit which detects a normal end of image formation by the image forming device; a remote message unit which transmits a remote message through the communication control unit to the central service station, the remote message indicating that the jam of the image forming device is continuously detected for a predetermined number of copy sheets before the normal end of image formation by the image forming device is detected; a time counter which outputs a time count indicating a period of the jam of the image forming device; and a remote message inhibition unit which inhibits the remote message unit from transmitting the remote message when the time count output by the time

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1 counter exceeds a predetermined value.

According to the present invention, the remote message inhibition unit inhibits the automatic message transmission when the time count output by the  
5 time counter exceeds a predetermined value. It is possible to effectively inhibits the automatic message transmission from the image forming device to the central service station when a jam of the image forming device occurs.

10 The above-mentioned third object of the present invention is achieved by an image forming device management system which includes a plurality of image forming devices, a central service station which provides a maintenance service for the image forming devices, and a  
15 communication device which connects one of the image forming devices to the central service station via a communication network, wherein each of the image forming devices includes: a remote message unit which transmits a remote message through the communication device to the  
20 central service station when a maintenance service of the image forming device is initiated or terminated by a serviceman; and a non-volatile memory which retains a content of a serviceman visit flag, the serviceman visit flag indicating whether the maintenance service of the  
25 image forming device is initiated or terminated by the

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1 serviceman.

According to the present invention, each of  
the image forming devices in the image forming device  
management system includes the non-volatile memory which  
5 retains the content of the serviceman visit flag, the  
serviceman visit flag indicating whether the maintenance  
service of the image forming device is initiated or  
terminated by the serviceman. By using the non-volatile  
memory, it is possible to start an automatic message  
10 transmission only in an appropriate situation when a  
maintenance service of an image forming device is  
performed by a serviceman.

The above-mentioned fourth object of the  
present invention is achieved by an image forming device  
15 management system which includes a plurality of image  
forming devices, a central service station which provides  
a maintenance service for the image forming devices, and a  
communication device which connects one of the image  
forming devices to the central service station via a  
20 communication network, wherein each of the image forming  
devices includes: a receiving unit which receives a non-  
resettable copy count and a remote message cycle, both  
transmitted to the image forming device by the central  
service station through the communication device, the copy  
25 count indicating a predetermined number of copy sheets

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1 with respect to a contract for use of the image forming  
device, the remote message cycle indicating a frequency at  
which the image forming device transmits a remote message  
to the central service station; a first storage unit which  
5 stores the copy count and the remote message cycle  
received by the receiving unit; a second storage unit  
which stores a current copy count that is incremented  
every time an image formation of one copy sheet is  
performed by the image forming device; a control unit  
10 which sets the image forming device in a remote message  
enable state when a difference between the current copy  
count and the received copy count reaches an integral  
multiple of the remote message cycle; and a remote message  
unit which transmits the remote message through the  
15 communication device to the central service station after  
the image forming device is set in the remote message  
enable state by the control unit.

According to the present invention, the  
image forming device of concern is set in the remote  
20 message enable state when the difference between the  
current copy count and the received copy count reaches an  
integral multiple of the remote message cycle. The remote  
message unit transmits the remote message to the central  
service station after the image forming device is set in  
25 the remote message enable state. It is possible for the

1 image forming device management system of the present  
invention to efficiently carry out a block billing  
function.

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The above-mentioned fifth object of the  
5 present invention is achieved by an image forming device  
management system which includes a plurality of image  
forming devices, a central service station which provides  
a maintenance service for the image forming devices, and a  
communication device which connects one of the image  
10 forming devices to the central service station via a  
communication network, wherein each of the image forming  
devices includes: a receiving unit which receives a non-  
resettable copy count and a remote message cycle, both  
transmitted to the image forming device by the central  
15 service station through the communication device, the copy  
count indicating a predetermined number of copy sheets  
with respect to a contract for use of the image forming  
device, the remote message cycle indicating a frequency at  
which the image forming device transmits a remote message  
20 to the central service station; a first storage unit which  
stores the copy count and the remote message cycle  
received by the receiving unit; a second storage unit  
which stores a current copy count that is incremented  
every time an image formation of one copy sheet is  
25 performed by the image forming device; a control unit

1     which sets the image forming device in a remote message  
enable state when a difference between the current copy  
count and the received copy count reaches an integral  
multiple of the remote message cycle; and a remote message  
5     unit which transmits the remote message through the  
communication device to the central service station after  
the image forming device is set in the remote message  
enable state by the control unit, and wherein the remote  
message transmitted to the central service station by the  
10    remote message unit includes a remote message purpose and  
the current copy count.

It is possible for the image forming device  
management system of the present invention to provide a  
precise management of the image forming devices by  
15    performing a block billing function in a simple manner.

The above-mentioned sixth object of the  
present invention is achieved by an image forming device  
management system which includes a plurality of image  
forming devices, each of the image forming devices having  
20    operating parameters stored in a memory of the image  
forming device, and absolute addresses of the memory where  
the respective operating parameters are stored being  
predetermined according to a kind of each operating  
parameter, a central service station which reads  
25    information from or writes information to the operating

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1 parameters of one of the image forming devices by  
transmitting an access request to said one of the image  
forming devices, and a communication device which connects  
one of the image forming devices to the central service  
5 station via a communication network, wherein the central  
service station includes: a parameter code transmitting  
unit which transmits a parameter code, indicating a kind  
of a particular one of the operating parameters, through  
the communication device to one of the image forming  
10 devices when transmitting an access request to said one of  
the image forming devices, and wherein each of the image  
forming devices includes: an address determination unit  
responsive to the access request which determines a  
particular absolute address of the memory of the image  
15 forming device in accordance with the parameter code  
transmitted by the code transmitting unit; and an access  
request processing unit which accesses the particular one  
of the operating parameters at the absolute address of the  
memory determined by the address determination unit.

20 According to the present invention, each of  
the image forming devices in the image forming device  
management system has the absolute addresses of the memory  
where the respective operating parameters are stored which  
are predetermined according to the kind of each operating  
25 parameter. The access request processing unit accesses

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1 one of the operating parameters at an absolute address of  
the memory determined by the address determination unit.  
It is possible to avoid dealing with individual absolute  
addresses of the memory for each of different kinds of  
5 image forming devices. It is possible to provide an easy-  
to-use management operation for the user.

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The above-mentioned seventh object of the  
present invention is achieved by an image forming device  
management system which includes a plurality of image  
10 forming devices, each of the image forming devices having  
operating parameters stored in a memory of the image  
forming device, and absolute addresses of the memory where  
the respective operating parameters are stored being  
predetermined according to a kind of each operating  
15 parameter, a central service station which reads  
information from or writes information to the operating  
parameters of one of the image forming devices by  
transmitting an access request to said one of the image  
forming devices, and a communication device which connects  
20 one of the image forming devices to the central service  
station via a communication network, wherein the central  
service station includes: a parameter code transmitting  
unit which transmits a parameter code, indicating a kind  
of a particular one of the operating parameters, through  
25 the communication device to one of the image forming

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1 devices when transmitting an access request to said one of  
the image forming devices, and wherein each of the image  
forming devices includes: an address determination unit  
responsive to the access request which determines a  
5 particular absolute address of the memory of the image  
forming device in accordance with the parameter code  
transmitted by the code transmitting unit; and an access  
request processing unit which accesses the particular one  
of the operating parameters at the absolute address of the  
10 memory determined by the address determination unit, and  
wherein the image forming devices are of different models  
and share a common parameter code indicating an identical  
kind for the operating parameters of the individual image  
forming devices regardless of the model of each image  
15 forming device.

According to the above-described image  
forming device management system, it is possible to  
provide a simple management scheme for the central service  
station and need not deal with individual absolute  
20 addresses of the memory for each of different kinds of  
image forming devices.

The above-mentioned eighth object of the  
present invention is achieved by an image forming device  
management system which includes a plurality of image  
25 forming devices, a central service station which provides



1 a maintenance service for the image forming devices, and a  
communication device which connects one of the image  
forming devices to the central service station via a  
communication network, wherein each of the image forming  
5 devices includes: a first request unit which outputs a  
mode shift request to the image forming device, the mode  
shift request initiating a shift of the image forming  
device to a maintenance mode; a maintenance mode start  
unit which sets the image forming device in the  
10 maintenance mode in response to the mode shift request  
output by the first request unit; a first remote message  
unit which transmits a first remote message through the  
communication device to the central service station in  
response to the mode shift request output by the first  
15 request means, the first remote message indicating a start  
of a maintenance service of the image forming device; a  
second request unit which outputs a maintenance end  
request to the image forming device, the maintenance end  
request terminating the maintenance mode of the image  
20 forming device; and a second remote message unit which  
transmits a second remote message through the  
communication device to the central service station in  
response to the maintenance end request output by the  
second request unit, the second remote message indicating  
25 an end of the maintenance service of the image forming

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1 device.

Further, the above-mentioned eighth object  
of the present invention is achieved by an image forming  
device management system which includes a plurality of  
5 image forming devices, a central service station which  
provides a maintenance service for the image forming  
devices, and a communication device which connects one of  
the image forming devices to the central service station  
via a communication network, wherein each of the image  
10 forming devices includes: a first request unit which  
outputs a mode shift request to the image forming device,  
a first display unit which displays a first mode shift key  
in response to the mode shift request output by the first  
request unit, a second request unit which initiates a  
15 shift of the image forming device to a maintenance mode  
when the first mode shift key displayed by the first  
display unit is turned ON; a maintenance mode start unit  
which sets the image forming device in the maintenance  
mode when the shift of the image forming device to the  
20 maintenance mode is initiated by the second request unit;  
a first remote message unit which transmits a first remote  
message through the communication device to the central  
service station when the shift of the image forming device  
to the maintenance mode is initiated by the second request  
25 unit, the first remote message indicating a start of a

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1 maintenance service of the image forming device; a third  
request unit which outputs a maintenance end request to  
the image forming device, the maintenance end request  
terminating the maintenance mode of the image forming  
5 device; and a second remote message unit which transmits a  
second remote message through the communication device to  
the central service station in response to the maintenance  
end request output by the second request unit, the second  
remote message indicating an end of the maintenance  
10 service of the image forming device.

It is possible for the above-described  
image forming device management system to manage an  
accurate time of the start or the end of the maintenance  
service of each of image forming devices by the  
15 serviceman.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features and advantages of  
the present invention will be more apparent from the  
20 following detailed description when read in conjunction  
with the accompanying drawings in which:

FIG. 1 is a block diagram of one embodiment  
of an image forming device management system of the  
present invention;

25 FIG. 2 is a block diagram of a control part

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1 of a copier in the image forming device management system  
of FIG. 1;

FIG. 3 is a block diagram of a  
communication control unit CCU in the image forming device  
5 management system of FIG. 1;

FIG. 4 is a block diagram of a central  
service station CSS in the image forming device management  
system of FIG. 1;

FIG. 5 is a diagram for explaining a  
10 communication sequence of a remote message transmission  
when a remote message key is turned ON;

FIG. 6 is a diagram for explaining a  
communication sequence of a remote message transmission  
when a self-diagnostic error takes place;

15 FIG. 7 is a diagram for explaining a  
communication sequence of a remote message transmission  
when an advance warning remote message is transmitted;

FIG. 8A, FIG. 8B and FIG. 8C are diagrams  
for explaining respective communication sequences when a  
20 read request, a write request and an execute request are  
transmitted to the copier by the CSS;

FIG. 9A, FIG. 9B and FIG. 9C are diagrams  
for explaining respective communication sequences when a  
read request, a write request and an execute request are  
25 transmitted to the CCU by the CSS;

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1               FIG. 10 is a diagram for explaining a  
communication sequence when a read request is transmitted  
to the copier by the CCU;

              FIG. 11 is a diagram for explaining various  
5     parameters which are set in the CCU;

              FIG. 12A, FIG. 12B and FIG. 12C are  
diagrams for explaining data formats of messages when a  
remote message transmission is performed;

              FIG. 13A, FIG. 13B and FIG. 13C are  
10    diagrams for explaining data formats of messages when a  
request is transmitted to the copier by the CSS;

              FIG. 14A, FIG. 14B and FIG. 14C are  
diagrams for explaining data formats of messages when a  
request is transmitted to the CCU by the CSS;

15            FIG. 15A and FIG. 15B are diagrams for  
explaining data formats of messages when a request is  
transmitted to the copier by the CCU;

              FIG. 16 is a flowchart for explaining a  
remote message transmission process performed by a control  
20    unit of the copier;

              FIG. 17 is a flowchart for explaining a  
remote message key transmission sub-process in the remote  
message transmission process of FIG. 16;

              FIG. 18 is a flowchart for explaining a  
25    self-diagnostic error remote message sub-process in the

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1 remote message transmission process of FIG. 16;

FIG. 19 is a flowchart for explaining an advance warning remote message sub-process in the remote message transmission process of FIG. 16;

5 FIG. 20 is a flowchart for explaining a remote message transmission process performed by the control unit of the copier when a request is transmitted to the copier by the CCU;

FIG. 21 is a flowchart for explaining a read sub-process in the remote message transmission process of FIG. 20;

FIG. 22 is a flowchart for explaining a write sub-process in the remote message transmission process of FIG. 20;

15 FIG. 23 is a flowchart for explaining an execute sub-process in the remote message transmission process of FIG. 20;

FIG. 24 is a diagram for explaining a communication sequence of the CCU and the copier during an idle condition;

FIG. 25 is a diagram for explaining a communication sequence of the CCU and the copier during a remote message transmission;

25 FIG. 26 is a diagram for explaining a communication sequence of the CCU and the copier during a

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1 remote message receiving;

FIG. 27 is a diagram for explaining a communication sequence of the CCU and the copier when an access request is transmitted to the copier;

5 FIG. 28 is a flowchart for explaining a signal line separation message process performed by the copier in a first embodiment of the image forming device management system;

FIG. 29 is a flowchart for explaining a no-communication counter resetting process performed by the copier in the first embodiment;

FIG. 30 is a diagram for explaining a communication sequence of the CCU and the copier when the signal line separation message process utilizes a selecting of the CCU to the copier;

FIG. 31 is a diagram for explaining a communication sequence of the CSS and the copier when the signal line separation message process utilizes a selecting of the CSS to the copier;

FIG. 32 is a diagram for explaining a communication sequence of the CCU and the copier when the signal line separation message process utilizes a polling of the CCU to the copier;

FIG. 33 is a diagram for explaining a signal line separation message process utilizing a

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1 detection of a voltage of a terminal of a communication  
interface unit of the copier;

FIG. 34 is a flowchart for explaining a  
signal line separation message process performed by the  
5 copier using a detected voltage of the terminal of the  
communication interface unit;

FIG. 35A and FIG. 35B are diagrams for  
explaining a signal line separation message process  
utilizing a connect detection line between the CCU and the  
10 copier;

FIG. 36 is a flowchart for explaining a  
signal line separation message process performed by the  
copier using a connect detection line between the CCU and  
the copier;

15 FIG. 37 is a flowchart for explaining a  
first jam detection process performed by the copier in a  
second embodiment of the image forming device management  
system;

FIG. 38 is a flowchart for explaining a  
20 second jam detection process performed by the copier in  
the second embodiment;

FIG. 39 is a flowchart for explaining  
another second jam detection process performed by the  
copier in the second embodiment;

25 FIG. 40 is a flowchart for explaining a CSS

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1 function setting process performed by the copier in the  
second embodiment;

FIG. 41 is a flowchart for explaining a  
maintenance service start/end message process performed by  
5 the copier in a third embodiment of the image forming  
device management system;

FIG. 42 is a flowchart for explaining  
another maintenance service start/end message process  
performed by the copier in the third embodiment;

10 FIG. 43 is a flowchart for explaining a  
further maintenance service start/end message process  
performed by the copier in the third embodiment;

FIG. 44 is a block diagram of a fourth  
embodiment of the image forming device management system  
15 of the present invention;

FIG. 45 is a block diagram of a data  
communication device DCD in the fourth embodiment of the  
image forming device management system;

FIG. 46 is a flowchart for explaining a  
20 selecting process performed to a particular one of the  
image forming devices by the DCD in the fourth embodiment;

FIG. 47 is a flowchart for explaining a  
polling process performed to the image forming devices by  
the DCD in the fourth embodiment;

25 FIG. 48 is a block diagram of a control

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1 part of an image forming device in the fourth embodiment;

FIG. 49 is a block diagram of a personal interface PI in the control part of the image forming device in the fourth embodiment;

5 FIG. 50 is a schematic diagram of a control panel of the image forming device in the fourth embodiment;

FIG. 51 is a schematic diagram of a character display part in the control panel of the image forming device of FIG. 50;

FIG. 52 is a diagram for explaining a data format of a message transmitted between the CSS and the DCD in the fourth embodiment;

FIG. 53 is a diagram for explaining a data format of a message transmitted between the DCD and the PI in the fourth embodiment;

FIG. 54 is a diagram for explaining a data format of a message transmitted between the PI and the image forming device in the fourth embodiment;

20 FIG. 55 is a diagram for explaining a data format of the message transmitted between the PI and the image forming device in the fourth embodiment;

FIG. 56 is a flowchart for explaining a block billing process performed by the image forming device in the fourth embodiment;

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1           FIG. 57 is a diagram for explaining a data  
format of a message transmitted between the PI and the  
image forming device during the block billing process;

5           FIG. 58 is a diagram for explaining another  
data format of the message transmitted between the PI and  
the image forming device during the block billing process;

          FIG. 59 is a schematic diagram of a user-  
program mode indication displayed on the character display  
part in the control panel of the image forming device;

10          FIG. 60 is a block diagram of a fifth  
embodiment of the image forming device management system  
of the present invention;

          FIG. 61 is a diagram for explaining a  
parameter code stored in a ROM of an image forming device  
15       in the fifth embodiment;

          FIG. 62A and FIG. 62B are diagrams for  
explaining respective communication sequences when a read  
request and a write request are transmitted to the image  
forming device by the CSS;

20          FIG. 63 is a flowchart for explaining a  
main control process performed by a control part of the  
image forming device when an access request is transmitted  
to the image forming device by the CSS;

          FIG. 64 is a flowchart for explaining a  
25       read sub-process in the main control process of FIG. 63;

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1           FIG. 65 is a flowchart for explaining a  
write sub-process in the main control process of FIG. 63;

          FIG. 66 is a schematic diagram of a control  
panel of the image forming device in the sixth embodiment;

5           FIG. 67 is a schematic diagram of an image  
formation mode indication displayed on a character display  
part of the control panel of the image forming device of  
FIG. 66;

          FIG. 68 is a schematic diagram of a service  
10   program mode indication displayed on the character display  
part of the control panel of the image forming device of  
FIG. 66;

          FIG. 69 is a flowchart for explaining a  
maintenance service start message process performed by the  
15   image forming device in the sixth embodiment when a mode  
shift request is output;

          FIG. 70 is a flowchart for explaining a  
maintenance service end message process performed by the  
image forming device in the sixth embodiment;

20          FIG. 71 is a schematic diagram of a  
maintenance service start message key displayed on the  
character display part of the control panel of the image  
forming device of FIG. 66;

          FIG. 72 is a flowchart for explaining a  
25   maintenance service start message process performed by the

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1 image forming device in the sixth embodiment when a mode  
shift request is output;

FIG. 73 is a flowchart for explaining a  
maintenance service end message process performed by the  
5 image forming device in the sixth embodiment; and

FIG. 74A and FIG. 74B are diagrams for  
explaining data formats of a maintenance service start  
message and a maintenance service end message transmitted  
to the CSS by the image forming device.

10

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A description will now be given of the  
preferred embodiments of the present invention with  
reference to the accompanying drawings.

#### 15 1. FIRST EMBODIMENT

##### 1.1 STRUCTURE OF SYSTEM

FIG. 1 shows a first embodiment of the  
image forming device management system of the present  
invention. As shown in FIG. 1, in the image forming  
20 device management system of the first embodiment, a  
plurality of image forming devices 100, such as plain  
paper copiers PPC (shown in FIG. 1) or printers (not shown  
in FIG. 1), are provided on each of a user site US1 and a  
user site US2. It is a matter of course that the image  
25 forming device management system of the present invention

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1     may include only one image forming device. Hence, the  
image forming device management system may include one or  
more image forming devices 100 provided therein. For the  
sake of convenience, one of the image forming devices 100  
5     in the following description will be called the copier  
100, unless otherwise specified.

          In the image forming device management  
system of FIG. 1, a communication control unit CCU 200 is  
also provided on each of the user sites US1 and US2, and  
10    the plurality of image forming devices 100 of each user  
site are connected to the CCU 200. The CCU 200 of each  
user site is linked to a central service station CSS 300  
at a remote location via a public switched network PSN  
250. In the embodiment of FIG. 1, a telephone set 206a is  
15    connected to the CCU 200 of the user site US1, and a  
facsimile 206b is connected to the CCU 200 of the user  
site US2.

          The CCU 200 in the first embodiment is, for  
example, a communication control device that is capable of  
20    being connected up to five image forming devices, and the  
interface between each image forming device 100 and the  
CCU 200 is provided by a multidrop connection which is in  
conformity with RS-485 standard. The communication  
sequence between each image forming device 100 and the CCU  
25    200 is performed in accordance with basic data

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1 transmission procedures. The CCU 200 can communicate with  
one of the image forming devices 100 after a data link  
between the CCU 200 and the image forming device 100 is  
established by using a centralized polling/selecting  
5 control method. A specific device address can be set for  
each of the image forming devices 100 by setting an  
address setting switch (for example, the element 1031 in  
FIG. 2) of each image forming device 100, and a polling  
address and a selecting address can be set for each image  
10 forming device 100 in accordance with the specific device  
address.

## 1.2 STRUCTURE OF IMAGE FORMING DEVICE

### 1.2.1 MECHANICAL STRUCTURE

The copier 100 in the first embodiment is  
15 an analog-type image forming device in which an  
electrostatic latent image is formed on a photosensitive  
drum when an original image is optically read by a  
scanner. In the copier 100, a charger unit, a discharger  
unit, a developing unit, a transfer unit, a pre-transfer  
20 charger unit, a cleaning unit and a fixing unit, which are  
required to perform an electrophotographic process, are  
provided around the periphery of the photosensitive drum.  
Further, in the copier 100, a sheet supplying device and a  
sheet transporting device are provided. Such structure of  
25 the copier 100 is known in the prior art, and a detailed

1 description thereof will be omitted.

In a control panel (not shown) of the copier 100, various keys, displays and controls are provided, including a timer key, a timer indicator, a  
5 program key, an ENTER key, ten keys, a guidance key, a guidance indicator, a sizing key, a sizing indicator, a centering key, a centering indicator, a paper offset key, a paper offset indicator, a both side indicator, a remote message key, and a remote message indicator. The remote  
10 message key and the remote message indicator are related to the present invention and provided within the copier 100. The remote message key and the remote message indicator will be described later. Further, in the control panel of the copier 100, a duplex copy key, a page  
15 copy indicator, a page copy indicator, a delete key, a delete indicator, a sheet-designated sizing key, a sheet-designated sizing indicator, a zoom key, a reduce key, an enlarge key, a normal size key, a sheet select key, an auto sheet select key, a density adjust key, an auto  
20 density set key, a clear/stop key, a start key, an interrupt key, a preheat indicator, a mode-clear/preheat key, and etc.

#### 1.2.2 ELECTRICAL STRUCTURE

FIG. 2 shows a control part of one of the  
25 copiers 100 in the image forming device management system

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1 of the first embodiment. As shown in FIG. 2, the copier  
100 is controlled by a CPU (central processing unit) 1001.  
A control program executed by the CPU 1001 and control  
data used for controlling the copier 100 are stored in a  
5 ROM (read-only memory) 1002. A RAM (random access memory)  
1003 provides a working storage area for the CPU 1001 when  
executing the control program. A communication interface  
unit 1004 provides an interface between the copier 100 and  
the CCU 200 when the copier 100 transmits data to the CCU  
10 200 and receives control data and control codes from the  
CCU 200.

In the copier 100 of FIG. 2, an A/D  
(analog-to-digital) converter 1005 converts various  
operating voltages of various sensors 1006 of the copier  
15 100 into digital signals, and the digital signals are  
supplied to the CPU 1001. A lamp voltage of the scanner,  
a light emission voltage and a light receiving voltage of  
a P sensor (provided for adjusting a toner density), an  
output of an ADS (auto density setting) sensor, an output  
20 of a light amount sensor, an output of a current sensor of  
the photosensitive drum, and a voltage of a fixing unit  
thermistor are supplied to an input of the A/D converter  
1005. In the copier 100 of FIG. 2, when a fixing  
temperature indicated by the voltage of the fixing unit  
25 thermistor is below a given temperature, a copying

1 operation of the copier 100 is inhibited.

In the copier 100 of FIG. 2, an operation  
part 1010 includes the above-described keys of the control  
panel. The above-mentioned remote message key is provided  
5 within the operation part 1010 of the copier 100. The CPU  
1001 reads out the settings of the operation part 1010  
when a power switch is turned ON. A remote message enable  
switch 1032 is provided in the copier 100, and the remote  
message enable switch 1032 is connected to the CPU 1001.  
10 When the remote message enable switch 1032 is turned ON  
during the ON state of the power switch, the CPU 1001  
allows the copier 100 to perform a remote message  
transmission with respect to the CSS 300. When the remote  
message enable switch 1032 is turned OFF, the CPU 1001  
15 inhibits the copier 100 from performing the remote message  
transmission. Further, the CPU 1001 outputs a control  
signal to each of the above-described indicators of the  
control panel.

In the copier 100 of FIG. 2, an optical  
20 system control unit 1011 is connected to the CPU 1001, and  
the optical system control unit 1011 controls an exposure  
lamp 1012 of the scanner. A high-voltage supply unit 1013  
is connected to the CPU 1001, and the high-voltage supply  
unit 1013 supplies a high voltage to each of load  
25 resistors of various elements 1014 including the charger

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1 unit, the discharger unit, the transfer charger unit, the  
developing unit, and the PTC (pre-transfer charger) unit.  
A motor control unit 1015 is connected to the CPU 1001,  
and the motor control unit 1015 controls a main motor  
5 1016. A heater control unit 1017 is connected to the CPU  
1001, and the heater control unit 1017 controls a fixing  
heater 1018 of the fixing unit. A sensor control unit  
1021 is connected to the CPU 1001, and the sensor control  
unit 1021 controls various sensors 1022. Specifically,  
10 the sensor control unit 1021 controls a light receiving  
gain of each of the light amount sensor, the ADS sensor  
and the P sensor, and controls a light emission voltage of  
the P sensor.

### 1.3 COMMUNICATION CONTROL UNIT

15 FIG. 3 shows the CCU 200 in the image  
forming device management system of the first embodiment.  
As shown in FIG. 3, the CCU 200 is controlled by a CPU 201  
similar to the copier 100. A control program executed by  
the CPU 201 and control data used for controlling the CCU  
20 200 are stored in a ROM 202. A RAM 203 provides a working  
storage area for the CPU 201 when executing the control  
program. A battery 203a is connected to the RAM 203, and  
the battery 203a serves to allow the RAM 203 to retain  
intermediate results of the execution of the control  
25 program even after a power switch is turned OFF.

1                   Further, in the CCU 200 of FIG. 3, a  
switching device 207 is connected to the CPU 201, and the  
switching device 207 selects one of a connection of the  
telephone set 206a (or the facsimile 206b) and the PSN 250  
5   and a connection of the CCU 200 and the PSN 250. Either  
the telephone set 206a or the facsimile 206b may be  
connected through the switching device 207 to the CCU 200.  
A modem 204 is connected to the CPU 201 and the switching  
device 207, and the model 204 provides a communication  
10   interface between the CCU 200 and the PSN 250 when the  
copier 100 transmits data to the CSS 300 via the PSN 250  
and receives control data and control codes from the CSS  
300 via the PSN 250. An RS-485 interface unit 205  
provides the data transmission interface between the  
15   copier 100 and the CCU 200 which is in conformity with RS-  
485 standard. Further, in the CCU 200 of FIG. 3, a total  
counter value transmission enable switch 208 and a clock  
209 are provided.

                  The CCU 200 receives data supplied by the  
20   copier 100, and transmits the data through the PSN 250 to  
the CSS 300. Further, the CCU 200 receives control codes  
and control data supplied by the CSS 300, and transmits  
them to the copier 100. The CCU 200 sends a control  
signal to the high-voltage supply unit 1013 of the copier  
25   100 so as to control the ON/OFF of the power switch of the

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1 copier 100. The CCU 200 recognizes the identification of  
each of the copiers 100 which are connected the CCU 200  
within the same user site. The CCU 200 deals with the  
remote message transmission of each of the copiers 100  
5 connected to the CCU 200 within the same user site. The  
switching device 207 in the CCU 200 selects one of the  
connection of the telephone set 206a (or the facsimile  
206b) and the PSN 250 and the connection of the CCU 200  
and the PSN 250.

10 1.4 CENTRAL SERVICE STATION

FIG. 4 shows the CSS 300 in the image  
forming device management system of the first embodiment.  
As shown in FIG. 4, the CSS 300 includes a host computer  
301 which performs various management processes. A  
15 storage device 302 is connected to the host computer 301,  
and stores management data which is used by the host  
computer 301 when performing the management processes. A  
modem 303 is connected to the host computer 301, and  
provides a communication interface between the host  
20 computer 301 and the PSN 250 when the copier 100 transmits  
data to the CSS 300 via the PSN 250 and receives control  
data and control codes from the CSS 300 via the PSN 250.  
Further, in the CSS 300 of FIG. 4, a display monitor 304,  
a keyboard 305 and a printer 306 are provided.

25 1.5 COMMUNICATION SEQUENCES

1                   FIG. 5 shows a communication sequence of  
the remote message transmission when the remote message  
key is turned ON. When the remote message key, provided  
in the operation part 1010 of the copier 100, is turned  
5   ON, the copier 100 transmits a remote message key  
transmission message to the CCU 200, as shown in FIG. 5.  
The remote message key transmission message sent by the  
copier 100 is received by the CCU 200, and the CCU 200  
originates a call to a predetermined telephone number of  
10   the CSS 300 via the PSN 250. When a data link between the  
CCU 200 and the CSS 300 is established, the CCU 200  
transmits a remote message key transmission message to the  
CSS 300 via the PSN 250. The CSS 300 is usually installed  
at a service location remote from the user site. The  
15   message sent at this time to the CSS 300 by the CCU 200 is  
one of various kinds of messages sent to the CSS 300 by  
the CCU 200, and includes only data of preset parameters  
of the CCU 200 contained in the remote message key  
transmission message. The parameters of the CCU 200 can  
20   be set or rewritten by the CSS 300 through a data  
transmission from the CSS 300 to the CCU 200 via the PSN  
250.

When the transmission of the message from  
the CCU 200 to the CSS 300 is performed, the CCU 200  
25   transmits a transmission result to the copier 100 which is

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1 the originating station, the transmission result  
indicating a result of the transmission between the CCU  
200 and the CSS 300. By receiving the transmission result  
sent by the CCU 200, the copier 100 is informed as to  
5 whether the transmission of the message normally ends or  
abnormally ends.

The copier 100 generally has a self-  
diagnostic function. For example, when an error of the  
fixing temperature or an error of adjustment controls in  
10 the copier 100 is detected as a result of the self-  
diagnostic testing, an error message or a serviceman call  
message is displayed in the copier 100.

FIG. 6 shows a communication sequence of  
the remote message transmission when a self-diagnostic  
15 error takes place. When a self-diagnostic (S/D) error is  
detected as a result of the S/D testing of the copier 100,  
the copier 100 transmits an S/D error remote message to  
the CCU 200, as shown in FIG. 6. The S/D error remote  
message sent by the copier 100 is received by the CCU 200,  
20 and the CCU 200 originates a call to a predetermined  
telephone number of the CSS 300 via the PSN 250. When a  
data link between the CCU 200 and the CSS 300 is  
established, the CCU 200 transmits an S/D error remote  
message to the CSS 300 via the PSN 250. When the  
25 transmission of the message from the CCU 200 to the CSS

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1 300 is performed, the CCU 200 transmits a transmission  
result to the copier 100 which is the originating station,  
the transmission result indicating a result of the  
transmission between the CCU 200 and the CSS 300. By  
5 receiving the transmission result sent by the CCU 200, the  
copier 100 is informed as to whether the transmission of  
the message normally ends or abnormally ends.

The copier 100 generally has an advance  
warning function. For example, when no significant error  
10 is detected as a result of the self-diagnostic testing but  
the copier 100 determines that the copier 100 requires a  
maintenance service, an advance warning remote message is  
transmitted to the CSS 300 by the copier 100.

FIG. 7 shows a communication sequence of  
15 the remote message transmission when an advance warning  
remote message is transmitted. As shown in FIG. 7, the  
copier 100 transmits an advance warning remote message to  
the CCU 200. The advance warning remote message sent by  
the copier 100 is received by the CCU 200, and the CCU 200  
20 originates a call to a predetermined telephone number of  
the CSS 300 via the PSN 250. When a data link between the  
CCU 200 and the CSS 300 is established, the CCU 200  
transmits an advance warning remote message to the CSS 300  
via the PSN 250. The CCU 200 in this case does not  
25 transmit a transmission result to the copier 100 (or the

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1     originating station) when the transmission of the message  
from the CCU 200 to the CSS 300 is performed.

          When the S/D error remote message is sent  
to the CCU 200, the copier 100 in the first embodiment  
5     does not work. When the advance warning remote message is  
sent to the CCU 200, the copier 100 in the first  
embodiment is workable. Even during the transmission of  
the advance warning remote message, the copier 100 starts  
performing the copying operation if an original document  
10    is placed on the copier 100 and the start key is turned  
ON. However, when the load on the control part of the  
copier 100 will be excessively high if the copying  
operation is performed, the transmission of the advance  
warning remote message may be interrupted.

15           Generally, the degree of emergency for the  
advance warning remote message is lower than that for the  
A/D error remote message. It is possible to defer the  
transmission of the advance warning remote message from  
the CCU 200 to the CSS 300 until the frequency of use of  
20    the telephone set 206a or the facsimile 206b is kept at an  
adequately low level or until the traffic of the PSN 250  
is kept at an adequately low level. The deferred time of  
the transmission of the message can be set by the CSS 300  
through the communication between the CSS 300 and the CCU  
25    200 via the PSN 250.

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1                   FIG. 8A, FIG. 8B and FIG. 8C show  
respective communication sequences when a read request, a  
write request and an execute request are transmitted to  
the copier 100 by the CSS 300.

5                   The communication sequence of FIG. 8A is  
performed when a read request is transmitted to the copier  
100 by the CSS 300. The read request is issued by the CSS  
300 in order to read logging data of the copier 100, the  
10                  settings of the parameters of the copier 100 or the  
outputs of the sensors of the copier 100. The  
communication sequence of FIG. 8B is performed when a  
write request is transmitted to the copier 100 by the CSS  
300. The write request is issued by the CSS 300 in order  
to transmit new data from the CSS 300 to the copier 100  
15                  and write the new data to the parameters of the copier  
100. The communication sequence of FIG. 8C is performed  
when an execute request is transmitted to the copier 100  
by the CSS 300. The execute request is issued by the CSS  
300 in order to have the copier 100 perform a testing  
20                  operation.

                  In each of the communication sequences of  
FIG. 8A through FIG. 8C, the CSS 300 originates a call to  
a predetermined telephone number of the CCU 200 via the  
PSN 250. When a data link between the CCU 200 and the CSS  
25                  300 is established, the CSS 300 transmits a request to the

1 CSS 300 via the PSN 250. The request sent by the CSS 300  
includes an identification of a designation copier 100 to  
which the request is made by the CSS 300. When the  
request from the CSS 300 is received by the CCU 200, the  
5 CCU 200 transmits the request to the designation copier  
100. When the request from the CCU 200 is received by the  
designation copier 100, the designation copier 100  
processes the request and transmits a response to the  
request to the CCU 200. When the response from the  
10 designation copier 100 is received by the CCU 200, the CCU  
200 transmits the response to the CSS 300 via the PSN 250.  
In this manner, the communication sequence for each  
request sent to the copier 100 by the CSS 300 is performed  
by the image forming device management system of the first  
15 embodiment.

FIG. 9A, FIG. 9B and FIG. 9C show  
respective communication sequences when a read request, a  
write request and an execute request are transmitted to  
the CCU 200 by the CSS 300.

20 The communication sequence of FIG. 9A is  
performed when a read request is transmitted to the CCU  
200 by the CSS 300. The read request is issued by the CSS  
300 in order to read the settings of the parameters of the  
CCU 200 or the status of the CCU 200. Alternatively, the  
25 read request is issued by the CSS 300 in order to read the

1 internal data of the copier 100 previously read by the CCU  
200. The communication sequence of FIG. 9B is performed  
when a write request is transmitted to the CCU 200 by the  
CSS 300. The write request is issued by the CSS 300 in  
5 order to transmit new data from the CSS 300 to the CCU 200  
and write the new data to the parameters of the CCU 200.  
The communication sequence of FIG. 9C is performed when an  
execute request is transmitted to the CCU 200 by the CSS  
300. The execute request is issued by the CSS 300 in  
10 order to have the CCU 200 perform a testing operation.

In each of the communication sequences of  
FIG. 9A through FIG. 9C, the CSS 300 originates a call to  
a predetermined telephone number of the CCU 200 via the  
PSN 250. When a data link between the CCU 200 and the CSS  
15 300 is established, the CSS 300 transmits a request to the  
CSS 300 via the PSN 250. When the request from the CSS  
300 is received by the CCU 200, the CCU 200 processes the  
request and transmits a response to the request to the CSS  
300. In this manner, the communication sequence for each  
20 request sent to the CCU 200 by the CSS 300 is performed by  
the image forming device management system of the first  
embodiment.

FIG. 10 shows a communication sequence when  
a read request is transmitted to the copier 100 by the CCU  
25 200.

1           The communication sequence of FIG. 10 is  
performed when a read request is transmitted to the copier  
100 by the CCU 200. The read request is issued by the CCU  
200 regardless of the CSS 300, in order to read the  
5   logging data of the copier 100, the settings of the  
parameters of the copier 100 or the outputs of the sensors  
of the copier 100. In the communication sequence of FIG.  
10, the CCU 200 transmits a read request to the copier  
100. When the read request from the CCU 200 is received  
10 by the copier 100, the copier 100 processes the request  
and transmits a response to the request to the CCU 200.  
In this manner, the data of the copier 100 is read by the  
CCU 200. Further, the data of the copier 100 previously  
read by the CCU 200 is read by the CSS 300 by performing  
15 the communication sequence of FIG. 9A.

FIG. 11 shows various parameters which are  
set in the CCU 200 in the image forming device management  
system of the first embodiment. Suppose that device  
addresses 1 through 5 are assigned to the image forming  
20 devices 100 (or the copiers 100) in the image forming  
device management system of FIG. 1.

As shown in FIG. 11, the parameters, set in  
the CCU 200 are grouped into six blocks, including an  
image forming device block, a remote message key  
25 transmission block, an S/D error remote message block, an

1 advance warning remote message block, a total counter  
value transmission block, and a telephone setting block.  
In the image forming device block, a model number and a  
serial number are retained with respect to each of the  
5 respective copiers 100. When a message is transmitted  
from a particular one of the copiers 100 to the CCU 200,  
the CCU 200 adds the model number and serial number (or  
the parameters corresponding to that copier 100) to the  
message as the identification of that copier 100, and  
10 transmits the message, including the identification of the  
copier 100, to the CSS 300. When an access request,  
including an identification of a destination copier 100,  
is transmitted to the CCU 200 by the CSS 300, the CCU 200  
selects a particular one of the copiers 100 by the  
15 identification of the copier included in the request, and  
transmits the request to the selected one of the copiers  
100.

With respect to each of the remote message  
key transmission block, the S/D error remote message block  
20 and the advance warning remote message block, a  
destination telephone number, the number of redials, a  
redial period, and conditions of data transmission to the  
CSS 300 in the remote message transmission are retained in  
the CCU 200 as shown in FIG. 11. In addition, in the  
25 advance warning remote message block, a notification time

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1 (at which a remote message is transmitted to the CSS 300)  
is further retained in the CCU 200.

Further, in the total counter value  
transmission process block in the parameters of the CCU  
5 200, a total counter value collection time, a destination  
telephone number, and transmission date and time are  
retained as shown in FIG. 11. In the telephone setting  
block, a dial mode setting (a dial pulse or a dial tone),  
and a dial pulse period setting are retained. Further,  
10 with respect to each of the respective blocks in the  
parameters of the CCU 200, a check sum is provided for an  
error detection. The parameters of the CCU 200 can be set  
or rewritten by the CSS 300 through a data transmission  
from the CSS 300 to the CCU 200 via the PSN 250.  
15 Alternatively, a portable special device for parameter  
setting may be connected to the CCU 200 so as to set or  
rewrite the parameters of the CCU 200 by using the special  
device. In the image forming device management system of  
the present invention, a total counter of the copier 100  
20 is usually non-resettable, and the total counter value  
output by the total counter is an accumulated value  
incremented from an initial value, and indicates a total  
of copy sheets for which image formation is performed by  
the copier 100.

25 1.6 DATA FORMAT OF MESSAGES

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1                   FIG. 12A, FIG. 12B and FIG. 12C show data  
formats of messages when a remote message transmission is  
performed.

5                   FIG. 12A shows a data format of a remote  
message sent from the copier 100 to the CCU 200. As shown  
in FIG. 12A, the remote message includes a message code in  
the first field, and the number of jams, the number of  
self-diagnostic (S/D) errors, the number of copy sheets  
and a state of the copier in the subsequent fields. The  
10 message code in the first field indicates which of a  
remote message key transmission, an S/D error remote  
message transmission and an advance warning remote message  
transmission is related to that remote message. The state  
of the copier in the final field indicates various states  
15 of the copier, including a lack of a replenishment part,  
such as toner, oil or paper, an output of a certain  
sensor, a setting of an adjustment point, and a state of  
connection of the copier elements.

20                   FIG. 12B shows a data format of a remote  
message sent from the CCU 200 to the CSS 300. As shown in  
FIG. 12B, the remote message includes a model number and  
serial number in the first field, and the message code,  
the number of S/D errors, the state of the copier and an  
occurrence time in the subsequent fields. The model  
25 number and the serial number in the first field are

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1 specific to the originating copier 100. The message code,  
the number of jams, the number of S/D errors, the number  
of copy sheets, and the state of the copier in the  
subsequent fields are the same as those of the message  
5 sent from the copier 100. The occurrence time in the  
final field indicates a time the remote message is  
produced, and this time is output by the clock 209 of the  
CCU 200. The contents of the subsequent fields (except  
the final field) of the remote message sent from the CCU  
10 200 to the CSS 300 may vary according to the parameters of  
the CCU 200. In the example of FIG. 12B, the parameters  
of the CCU 200 are set such that the remote message  
includes only the message code, the number of the S/D  
errors and the state of the copier.

15 FIG. 12C shows a data format of a response  
sent from the CCU 200 to the copier 100. As shown in FIG.  
12C, the response includes a response code in the first  
field and the contents of the response in the final field.

FIG. 13A, FIG. 13B and FIG. 13C show  
20 respective data formats of messages when an access request  
is transmitted to the copier 100 (or the destination  
copier 100) by the CSS 300.

FIG. 13A shows respective data formats of  
each of a read request sent from the CSS 300 to the CCU  
25 200, a read request sent from the CCU 200 to the copier

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1 100, a response sent from the copier 100 to the CCU 200,  
and a response sent from the CCU 200 to the CSS 300. As  
shown in FIG. 13A, the read request, sent to the CCU 200  
by the CSS 300, includes a model number and serial number  
5 in the first field, and a read request code and an item  
code in the subsequent fields. The model number and the  
serial number in the first field of this message indicates  
an identification of the copier 100 which is to be  
accessed by the CSS 300 by the read request. The read  
10 request, sent to the copier 100 by the CCU 200, includes  
the read request code in the first field and the item code  
in the second field, which are the same as corresponding  
ones of the read request sent to the CCU 200 by the CSS  
300.

15 Further, as shown in FIG. 13A, the  
response, sent to the CCU 200 by the copier 100, includes  
a read response code in the first field, and an item code  
and a read data in the subsequent fields. The read data  
in the final field of this message indicates the result in  
20 response to the access request made by the CSS 300. The  
response, sent to the CSS 300 by the CCU 200, includes the  
model number and the serial number in the first field, and  
the read response code, the item code and the read data in  
the subsequent fields. The model number and the serial  
25 number in the first field of this message indicate the

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1 identification of the copier 100.

FIG. 13B shows respective data formats of  
each of a write request sent from the CSS 300 to the CCU  
200, a write request sent from the CCU 200 to the copier  
5 100, a response sent from the copier 100 to the CCU 200  
and a response sent from the CCU 200 to the CSS 300. As  
shown in FIG. 13B, the messages in the write request case  
are essentially the same as corresponding messages in the  
read request case of FIG. 13A except for the following  
10 points. Both the write request sent to the CCU 200 by the  
CSS 300 and the write request sent to the copier 100 by  
the CCU 200 additionally include a writing data in the  
respective final fields. Both the response sent to the  
CCU 200 by the copier 100 and the response sent to the CSS  
15 300 by the CCU 200 include the written data in the  
respective final fields instead of the read data in the  
response of FIG. 13A. Usually, the written data of the  
response sent by the copier 100 is the same as the writing  
data of the write request sent by the CSS 300. However,  
20 when the writing data received from the CSS 300 is out of  
an effective data range of the copier 100, the written  
data of the response sent by the copier 100 may be rounded  
within the effective data range.

FIG. 13C shows respective data formats of  
25 each of an execute request sent from the CSS 300 to the

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1 CCU 200, an execute request sent from the CCU 200 to the  
copier 100, a response sent from the copier 100 to the CCU  
200 and a response sent from the CCU 200 to the CSS 300.  
As shown in FIG. 13C, the messages in the execute request  
5 case are essentially the same as corresponding messages in  
the read request case of FIG. 13A except for the following  
points. Both the execute request sent to the CCU 200 by  
the CSS 300 and the execute request sent to the copier 100  
by the CCU 200 additionally include a subsidiary parameter  
10 in the respective final fields. The subsidiary parameter  
indicates a supplementary command parameter of the execute  
request other than the item code. Both the response sent  
to the CCU 200 by the copier 100 and the response sent to  
the CSS 300 by the CCU 200 include the execution result in  
15 the respective final fields instead of the read data in  
the responses of FIG. 13A.

FIG. 14A, FIG. 14B and FIG. 14C show data  
formats of messages when an access request is transmitted  
to the CCU 200 by the CSS 300.

20 As shown in FIG. 14A through FIG. 14C, the  
messages in the CSS-to-CCU access request case are  
essentially the same as corresponding messages in the CSS-  
to-copier access request case of FIG. 13A through FIG. 13C  
except for the following points. Both the access requests  
25 sent to the CCU 200 by the CSS 300 and the responses sent

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1 to the CSS 300 by the CCU 200 include a CCU device code in  
the respective first fields as an identification of the  
CCU 200 instead of the identification (or the model number  
and the serial number) of the copier 100 in the CSS-to-  
5 copier access request case of FIG. 13A through FIG. 13C.

FIG. 15A and FIG. 15B show data formats of  
messages when a read request is transmitted to the copier  
100 by the CCU 200.

As shown in FIG. 15A, the read request sent  
10 to the copier 100 by the CCU 200 in the CCU-to-copier case  
is the same as the corresponding message in the CSS-to-  
copier read request case of FIG. 13A. As shown in FIG.  
15B, the response sent to the CCU 200 by the copier 100 in  
the CCU-to-copier case is the same as the corresponding  
15 message in the CSS-to-copier response case of FIG. 13A.  
Hence, the copier 100 deals with the messages in the same  
manner for both the CCU-to-copier read access case and the  
CSS-to-copier read access case.

## 1. 7 REMOTE MESSAGE TRANSMISSION PROCESS

### 20 1.7.1 REMOTE MESSAGE TRANSMISSION PROCESS BY COPIER

Next, a description will be given of a  
remote message transmission process performed by the  
copier 100 in the first embodiment, with reference to FIG.  
16 through FIG. 19.

25 FIG. 16 shows a remote message transmission

1 process performed by the CPU 1001 of the copier 100 of  
FIG. 1 in the first embodiment. As shown in FIG. 16, at  
the start of the remote message transmission process, the  
CPU 1001 of the copier 100 at step S1 determines whether  
5 the remote message (R/M) enable switch 1032 (FIG. 2) is in  
its ON state.

When the result at the step S1 is  
affirmative, the CPU 1001 at step S2 determines whether  
the remote message key of the operation part 1010 (FIG. 2)  
10 is in its ON state. Otherwise, the remote message  
transmission process of FIG. 16 at the present cycle ends.

When the result at the step S2 is  
affirmative, the CPU 1001 at step S3 performs a remote  
message (R/M) key transmission sub-process. The control  
15 of the CPU 1001 is transferred to a start of the R/M key  
transmission sub-process shown in FIG. 17, which will be  
described below.

When the result at the step S2 is negative,  
the CPU 1001 at step S4 determines whether a self-  
20 diagnostic (S/D) error has occurred. When the result at  
the step S4 is affirmative, the CPU 1001 at step S5  
performs a self-diagnostic (S/D) error remote message sub-  
process. The control of the CPU 1001 is transferred to a  
start of the S/D error remote message sub-process shown in  
25 FIG. 18, which will be described below.

1                   When the result at the step S4 is negative,  
the CPU 1001 at step S6 determines whether an advance  
warning has been issued. When the result at the step S6  
is affirmative, the CPU 1001 at step S7 performs an  
5   advance warning (A/W) remote message sub-process. The  
control of the CPU 1001 is transferred to a start of the  
A/W remote message sub-process shown in FIG. 19, which  
will be described below. Otherwise, the remote message  
transmission process of FIG. 16 at the present cycle ends.

10                  FIG. 17 shows a remote message (R/M) key  
transmission sub-process in the remote message  
transmission process of FIG. 16.

As shown in FIG. 17, at the start of the  
R/M key transmission sub-process, the CPU 1001 at step S11  
15   transmits a remote message to the CCU 200 in response to  
the ON state of the remote message key. After the step  
S11 is performed, the CPU 1001 at step S12 determines  
whether an end-of-transmission (EOT) signal from the CCU  
200 is normally received by the copier 100.

20                  When the result at the step S12 is  
affirmative, the CPU 1001 at step S13 resets a time-out  
timer to zero. Otherwise the CPU 1001 at step S16  
displays a transmission error message on the operation  
part 1010 and does not perform the step S13.

25                  After the step S13 is performed (or the

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1 time-out timer is reset to zero), the CPU 1001 at step S14  
determines whether a response message sent by the CCU 200  
in reply to the R/M key remote message has been received  
by the copier 100. The CPU 1001 at step S15 determines  
5 whether the time-out timer exceeds a given waiting period  
(for example, three minutes).

When the result at the step S15 is  
affirmative (the time-out timer exceeds three minutes),  
the CPU 1001 performs the above step S16 (in which the  
10 transmission error message is displayed). Otherwise the  
CPU repeats the above step S14.

When the result at the step S14 is  
affirmative (or the response message of the CCU 200 is  
received), the CPU 1001 at step S17 determines whether the  
15 response message of the CCU 200 indicates an  
acknowledgement of receipt of the remote message sent to  
the CCU 200 by the copier 100.

When the result at the step S17 is  
negative, the CPU 1001 performs the above step S16 (or the  
20 transmission error message is displayed on the operation  
part 1010). On the other hand, when the result at the  
step S17 is affirmative, the CPU 1001 at step S18 displays  
a transmission end message for the transmitted remote  
message on the operation part 1010. After the step S18 is  
25 performed, the R/M key transmission sub-process ends.

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1                   FIG. 18 shows a self-diagnostic (S/D) error  
remote message sub-process in the remote message  
transmission process of FIG. 16.

As shown in FIG. 18, at the start of the  
5   S/D error remote message sub-process, the CPU 1001 at step  
S21 transmits a remote message to the CCU 200 in response  
to the self-diagnostic error having occurred. After the  
step S21 is performed, the CPU 1001 at step S22 determines  
whether an end-of-transmission (EOT) signal from the CCU  
10   200 is normally received by the copier 100.

When the result at the step S22 is  
affirmative, the CPU 1001 at step S23 resets a time-out  
timer to zero. Otherwise the CPU 1001 at step S26  
displays a transmission error message on the operation  
15   part 1010 and does not perform the step S23.

After the step S23 is performed (or the  
time-out timer is reset to zero), the CPU 1001 at step S24  
determines whether a response message sent by the CCU 200  
in reply to the S/D error remote message has been received  
20   by the copier 100. The CPU 100 at step S25 determines  
whether the time-out timer exceeds a given waiting period  
(for example, twenty minutes).

When the result at the step S25 is  
affirmative (the time-out timer exceeds twenty minutes),  
25   the CPU 1001 performs the above-mentioned step S26 (in

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1 which the transmission error message is displayed).  
Otherwise the CPU repeats the step S24.

When the result at the step S24 is  
affirmative (or the response of the CCU 200 is received),  
5 the CPU 1001 at step S27 determines whether the response  
message of the CCU 200 indicates an acknowledgement of  
receipt of the remote message sent by the copier 100.

When the result at the step S27 is  
negative, the CPU 1001 performs the above step S26 (or the  
10 transmission error message is displayed on the operation  
part 1010). On the other hand, when the result at the  
step S27 is affirmative, the CPU 1001 at step S28 displays  
a transmission end message for the transmitted remote  
message on the operation part 1010. After the step S28 is  
15 performed, the A/W remote message sub-process ends.

FIG. 19 shows an advance warning (A/W)  
remote message sub-process in the remote message  
transmission process of FIG. 16.

As shown in FIG. 19, at the start of the  
20 A/W remote message sub-process, the CPU 1001 at step S31  
transmits a remote message to the CCU 200 in response to  
the advance warning. After the step S31 is performed, the  
A/W remote message sub-process of FIG. 19 ends.

#### 1.7.2 ACCESS REQUEST FROM CCU TO COPIER

25 A description will be given of a remote

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1 message transmission process performed by the copier 100  
when an access request is transmitted to the copier 100.

FIG. 20 shows a remote message transmission  
process performed by the copier 100 when an access request  
5 is sent to the copier 100 by the CCU 200.

As shown in FIG. 20, at the start of the  
remote message transmission process, the CPU 1001 of the  
copier 100 at step S41 determines whether the remote  
message enable switch 1032 (FIG. 2) is in its ON state.

10 When the result at the step S41 is  
affirmative (or the switch 1032 is in the ON state), the  
CPU 1001 at step S42 determines whether the communication  
interface unit 1004 contains an access request sent to the  
copier 100 by the CCU 200. Otherwise the CPU 1001 ends  
15 the remote message transmission process of FIG. 20 and  
does not perform the step S42.

When the result at the step S42 is  
affirmative, the CPU 1001 at step S43 receives the access  
request contained in the communication interface unit  
20 1004. After the step S43 is performed, the CPU 1001 at  
step S44 determines whether the received access request is  
a read request sent to the copier 100 by the CCU 200.

When the result at the step S44 is  
affirmative, the CPU 1001 at step S45 performs a read sub-  
25 process. The control of the CPU 1001 is transferred to a

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1 start of the read sub-process shown in FIG. 21, which will  
be described below.

When the result at the step S44 is  
negative, the CPU 1001 at step S46 determines whether the  
5 received access request is a write request sent to the  
copier 100 by the CCU 200.

When the result at the step S46 is  
affirmative, the CPU 1001 at step S47 performs a write  
sub-process. The control of the CPU 1001 is transferred  
10 to a start of the write sub-process shown in FIG. 22,  
which will be described below.

When the result at the step S46 is  
negative, the CPU 1001 at step S48 determines whether the  
received access request is an execute request sent to the  
15 copier 100 by the CCU 200.

When the result at the step S48 is  
affirmative, the CPU 1001 at step S49 performs an execute  
sub-process. The control of the CPU 1001 is transferred  
to a start of the execute sub-process shown in FIG. 23,  
20 which will be described below. Otherwise it is determined  
that the received access request does not match any  
request code, and the CPU 1001 at step S50 transmits an  
error code from the copier 100 to the CCU 200. After the  
step S50 is performed, the remote message transmission  
25 process of FIG. 20 at the present cycle ends.

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1           FIG. 21 shows a read sub-process in the  
remote message transmission process of FIG. 20.

          As shown in FIG. 21, at the start of the  
read sub-process, the CPU 1001 at step S51 determines  
5       whether the item code of the received request correctly  
matches a predetermined code. When the result at the step  
S51 is affirmative, the CPU 1001 at step S52 transmits a  
response to the received request to the CCU 200. On the  
other hand, when the result at the step S51 is negative,  
10      it is determined that the item code of the received  
request does not match the predetermined code, and the CPU  
1001 at step S53 transmits an error code to the CCU 200.

          After the step S52 or the step S53 is  
performed, the read sub-process at the present cycle ends.

15          FIG. 22 shows a write sub-process in the  
remote message transmission process of FIG. 20.

          As shown in FIG. 22, at the start of the  
write sub-process, the CPU 1001 at step S61 determines  
whether the item code of the received write request  
20      correctly matches a predetermined code. When the result  
at the step S61 is affirmative, the CPU 1001 at step S62  
determines whether the writing data of the received write  
request is in an effective data range of the copier 100.

          When the result at the step S62 is  
25      affirmative, the CPU 1001 at step S63 writes the writing

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1 data of the received write request to the copier 100.  
After the step S63 is performed, the CPU 1001 at step S64  
transmits a response, including the written data, to the  
CCU 200. After the step S64 is performed, the CPU 1001  
5 ends the write sub-process of FIG. 22.

When the result at the step S62 is  
negative, the CPU 1001 at step S65 determines whether the  
writing data of the received write request can be rounded  
within the effective data range of the copier 100.

10 When the result at the step S65 is  
affirmative, the CPU 1001 at step S66 writes the rounded  
writing data to the copier 100. After the step S66 is  
performed, the CPU 1001 performs the above step S64. On  
the other hand, when the result at the step S65 is  
15 negative, the CPU 1001 at step S67 transmits an error code  
to the CCU 200. After the step S67 is performed, the CPU  
1001 ends the write sub-process of FIG. 22.

FIG. 23 shows an execute sub-process in the  
remote message transmission process of FIG. 20.

20 As shown in FIG. 23, at the start of the  
execute sub-process, the CPU 1001 at step S71 determines  
whether the item code of the received execute request  
correctly matches a predetermined code. When the result  
at the step S71 is negative, the CPU 1001 at step S76  
25 transmits an error code to the CCU 200. On the other

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1 hand, when the result at the step S71 is affirmative, the  
CPU 1001 at step S72 determines whether the received  
execute request needs a subsidiary parameter.

When the result at the step S72 is  
5 negative, the CPU 1001 at step S73 executes an operation  
on the copier 100 in accordance with the received execute  
request. After the step S73 is performed, the CPU 1001 at  
step S74 transmits a response, including the execution  
result, to the CCU 200 from the copier 100. After the  
10 step S74 is performed, the CPU 1001 ends the execute sub-  
process of FIG. 23.

When the result at the step S72 is  
affirmative, the CPU 1001 at step S75 determines whether  
the subsidiary parameter of the received request is in an  
15 effective range of the copier 100.

When the result at the step S75 is  
affirmative, the CPU 1001 performs the above steps S73 and  
S74. On the other hand, when the result at the step S75  
is negative, the CPU 1001 performs the above step S76 in  
20 which an error code is transmitted to the CCU 200. After  
the step S76 is performed, the CPU 1001 ends the execute  
sub-process of FIG. 23.

#### 1.7.3 COMMUNICATION SEQUENCES OF CCU AND COPIER

FIG. 24 shows a communication sequence of  
25 the CCU 200 and the copier 100 during an idle condition.

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1 Suppose that the five copiers 100 are connected to the CCU  
200, and the copiers 100 and the CCU 200 are in the idle  
condition.

As shown in FIG. 24, a polling (ENQ) of the  
5 CCU 100 to a specific one of the copiers 100 is  
sequentially performed for all the copiers 100 by using a  
polling address of the specific one of the copiers 100.  
If there is no message which should be transmitted to the  
CCU 200, each of the copiers 100 sends back a negative  
10 acknowledgement (EOT) to the CCU 200 in response to the  
polling. If the EOT signal is received from all the  
copiers 100, the CCU 200 repeats the polling process.

FIG. 25 shows a communication sequence of  
the CCU 200 and the copier 100 during a remote message  
15 transmission. Suppose that there is a remote message  
which should be transmitted from the copier#2 100 to the  
CCU 200, and the copier#2 100 has a polling address "2".

As shown in FIG. 25, after the polling  
(P2ENQ) of the CCU 200 to the copier#2 is performed by  
20 using the polling address "2", the copier#2 transmits the  
message through the RS-485 interface 205 to the CCU 200.  
After the transmission of the message, the CCU 200  
transmits an acknowledgment (ACK) to the copier#2 at the  
polling address "2". After the ACK signal is received,  
25 the copier#2 transmits the EOT signal to the CCU 200.

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1                   FIG. 26 shows a communication sequence of  
the CCU 200 and the copier 100 during a remote message  
receiving. Suppose that there is a transmission result  
message which should be transmitted from the CCU 200 to  
5   the copier#5 100, and the copier#5 100 has a selecting  
address "5".

As shown in FIG. 26, after the polling  
process for all the copiers 100 is terminated by the CCU  
200, a selecting (P5ENQ) of the CCU 200 to the copier#5  
10   100 is performed by using the selecting address "5".  
After the selecting is performed, the copier#5 100 at the  
selecting address "5" transmits an acknowledgement (ACK)  
to the CCU 200. The CCU 200 transmits the transmission  
result message through the RS-485 interface 205 to the  
15   copier#5 100 at the selecting address "5". After the  
transmission of the message, the copier#5 100 at the  
selecting address "5" transmits an acknowledgment (ACK) to  
the CCU 200. After the ACK signal is received, the CCU  
200 transmits the EOT signal to the copier#5 100 at the  
20   selecting address "5". Then, the control of the CCU 200  
is transferred to the polling process.

FIG. 27 shows a communication sequence of  
the CCU 200 and the copier 100 when an access request is  
transmitted to the copier 100 by the CCU 200 (or by the  
25   CSS 300). Suppose that the access request is transmitted

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1 to the copier#3 100 by the CCU 200 or the CSS 300, and the  
copier#3 100 has a selecting address "3".

As shown in FIG. 27, after the selecting  
(P3ENQ) of the CCU 200 to the copier#3 100 is performed by  
5 using the selecting address "3", the copier#3 100 at the  
selecting address "3" transmits an acknowledgement (ACK)  
to the CCU 200. The CCU 200 transmits the access request  
(which is one of a read request, a write request and an  
execute request) through the RS-485 interface 205 to the  
10 copier#3 100 at the selecting address "3". After the  
transmission of the access request, the copier#3 100 at  
the selecting address "3" transmits an acknowledgment  
(ACK) to the CCU 200. After the ACK signal is received,  
the CCU 200 transmits the EOT signal to the copier#3 100  
15 at the selecting address "3". Then, the control of the  
CCU 200 is transferred to the polling process for the  
copier#3 100 at the address "3".

## 1.8 SIGNAL LINE SEPARATION MESSAGE PROCESS

### 1.8.1 NO-COMMUNICATION COUNTER METHOD

20 FIG. 28 shows a signal line separation  
message process performed by the copier 100 in a first  
embodiment of the image forming device management system  
of the present invention. The signal line separation  
message process of FIG. 28 utilizes a no-communication  
25 (N/C) counter in the CPU 1001 of the copier 100.

1           In the present embodiment, the polling of  
the CSS 300 for the copiers 100 is periodically performed.  
The period of performing the polling process is, for  
example, once for 24 hours or less. Further, in the  
5   present embodiment, the signal line separation message  
process of FIG. 28 is periodically initiated by the CPU  
1001 by using a timer.

As shown in FIG. 28, the CPU 1001 at step  
S101 determines whether a message display flag is set to  
10   "1" (or ON state). When the result at the step S101 is  
affirmative, the CPU 101 at step S103 determines whether  
the N/C counter is larger than a given value.

On the other hand, when the result at the  
step S101 is negative, the CPU 101 at step S102 increments  
15   the N/C counter. After the step S102 is performed, the  
CPU 101 performs the above step S103.

When the result at the step S103 is  
affirmative (or the N/C counter > the given value), the  
CPU 1001 at step S104 displays a signal line separation  
20   message on the operation part 1010. The signal line  
separation message indicates to the user of the copier 100  
that a separation of the signal line between the CCU 200  
and the copier 100 occurs. After the step S104 is  
performed, the CPU 1001 at step S105 sets the message  
25   display flag to "1". After the step S105 is performed,

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1 the signal line separation message process of FIG. 28  
ends.

On the other hand, when the result at the  
step S103 is negative (or the N/C counter < the given  
5 value), the CPU 1001 at step S106 determines whether the  
message display flag is set to "1". When the result at  
the step S106 is affirmative, the CPU 101 at step S107  
eliminates the signal line separation message from the  
operation part 1010. After the step S107 is performed,  
10 the CPU 1001 at step S108 resets the message display flag  
to "0" (or OFF state). After the step S108 is performed,  
the signal line separation message process of FIG. 28  
ends.

On the other hand, when the result at the  
15 step S106 is negative, the CPU 101 ends the signal line  
separation message process of FIG. 28 and does not  
perform the above steps S107 and S108.

FIG. 29 shows a no-communication counter  
resetting process performed by the copier 100 in the first  
20 embodiment. In the present embodiment, the no-  
communication counter resetting process of FIG. 29 is  
periodically initiated by the CPU 1001 by using a timer.

As shown in FIG. 29, the CPU 1001 at step  
S201 determines whether data sent from the CSS 300 or the  
25 CCU 200 is received by the communication interface unit

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1 1004. When the result at the step S201 is affirmative,  
the CPU 1001 at step S202 resets the N/C counter to "0".  
After the step S202 is performed, the no-communication  
counter resetting process of FIG. 29 ends. When the  
5 result at the step S201 is negative, the CPU 1001 ends the  
no-communication counter resetting process of FIG. 28, and  
does not perform the above step S202.

#### 1.8.2 CCU SELECTING METHOD

In the signal line separation message  
10 process of FIG. 28, the period of time during which the  
copier 100 has no signal from the CCU 200 or the CSS 300  
is detected by using the no-communication (N/C) counter.  
Alternatively, the signal line separation message process  
may be performed by using a different method.

15 FIG. 30 shows a communication sequence of  
the CCU 200 and the copier 100 when a signal line  
separation message process is performed by using a  
selecting of the CCU 200 to the copiers 100.

In the present embodiment, the selecting of  
20 the CCU 200 to the copier 100 (or one of the copiers 100)  
is periodically performed. The period of performing the  
selecting process is, for example, once for 24 hours or  
less. In the present embodiment, the signal line  
separation process is performed by using the selecting of  
25 the CCU 200 to the copier 100.

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1                   As shown in FIG. 30, the selecting (ENQ) is  
periodically transmitted from the CCU 200 to the copier  
100 once for 24 hours or less. If there is a data link  
between the CCU 200 and the copier 100 is established at  
5       that time, the copier 100 transmits an acknowledgement  
(ACK) to the CCU 200 in response to the selecting (ENQ).  
After the ACK signal is received by the CCU 200, the CCU  
200 transmits a message to the copier 100. After the  
message is received by the copier 100, the copier 100  
10       transmits an acknowledgment (ACK) to the CCU 200.  
Further, after the ACK signal is received by the CCU 200,  
the CCU 200 transmits an EOT signal to the copier 100.  
When the EOT signal is received by the copier 100, the  
selecting process is normally terminated.

15                   Accordingly, in the present embodiment,  
when all the conditions for the above-mentioned selecting  
process are met, it is determined that the copier 100  
normally communicates with the CCU 200. In this case, the  
CPU 1001 performs only the steps S106-S108 of the signal  
20       line separation message process of FIG. 28. When any of  
the conditions for the above-mentioned selecting process  
is not met, it is determined that the copier 100 has no  
signal from the CCU 200. In this case, the CPU 1001  
performs only the steps S104 and S105 of the signal line  
25       separation message process of FIG. 28.

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1 1.8.3 CSS SELECTING METHOD

FIG. 31 shows a communication sequence of  
the CSS 300 and the copier 100 when a signal line  
separation message process is performed by using a  
5 selecting of the CSS 300 to the copier 100.

In the present embodiment, the selecting of  
the CSS 300 to the copier 100 is performed when an access  
request is transmitted to the copier 100. In the present  
embodiment, the signal line separation process is  
10 performed by using the selecting of the CSS 300 to the  
copier 100.

As shown in FIG. 31, the selecting of the  
CSS 300 is transmitted through the CCU 200 to the copier  
100 before transmitting an access request to the copier  
15 100. If there is a data link between the CCU 200 and the  
copier 100 is established at that time, the copier 100  
transmits an acknowledgement (ACK) to the CCU 200 in  
response to the selecting. After the ACK signal is  
received by the CCU 200, the CCU 200 transmits the access  
20 request (or the message) to the copier 100. After the  
message is received by the copier 100, the copier 100  
transmits an acknowledgment (ACK) to the CCU 200. Then,  
the selecting of the CSS 300 to the copier 100 is normally  
terminated.

25 Accordingly, in the present embodiment,

1 when all the conditions for the above-mentioned selecting  
process are met, it is determined that the copier 100  
normally communicates with the CCU 200. In this case, the  
CPU 1001 performs only the steps S106-S108 of the signal  
5 line separation message process of FIG. 28. When any of  
the conditions for the above-mentioned selecting process  
is not met, it is determined that the copier 100 has no  
signal from the CCU 200. In this case, the CPU 1001  
performs only the steps S104 and S105 of the signal line  
10 separation message process of FIG. 28.

#### 1.8.4 CCU POLLING METHOD

FIG. 32 shows a communication sequence of  
the CCU 200 and the copier 100 when a signal line  
separation message process is performed by using a polling  
15 of the CCU 200 to the copiers 100.

In the present embodiment, the polling of  
the CCU 200 to the copiers 100 is periodically performed.  
The period of performing the polling process is, for  
example, once for one minute. In the present embodiment,  
20 the signal line separation process is performed by using  
the polling of the CCU 200 to the copiers 100.

As shown in FIG. 32, the polling (ENQ) is  
transmitted from the CCU 200 to one of the copiers 100.  
If there is a data link between the CCU 200 and the copier  
25 100 is established at that time, the ENQ signal from the

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1 CCU 200 is received by the copier 100. In response to the  
polling (ENQ), the copier 100 transmits an acknowledgement  
(ACK) or an end-of-transmission (EOT) to the CCU 200.  
When the ACK or EOT signal is received by the CCU 200, the  
5 polling process is normally terminated.

Accordingly, in the present embodiment,  
when the condition for the above-mentioned polling process  
is met, it is determined that the copier 100 normally  
communicates with the CCU 200. In this case, the CPU 1001  
10 performs only the steps S106-S108 of the signal line  
separation message process of FIG. 28. When the condition  
for the above-mentioned polling process is not met, it is  
determined that the copier 100 has no signal from the CCU  
200. In this case, the CPU 1001 performs only the steps  
15 S104 and S105 of the signal line separation message  
process of FIG. 28.

#### 1.8.5 DETECTION OF VOLTAGE OF TERMINAL OF COMMUNICATION INTERFACE UNIT

FIG. 33 is a diagram for explaining a  
20 signal line separation message process which is performed  
by using a detection of a voltage of a receiving terminal  
100R of the communication interface unit 1004 of the  
copier 100.

In the image forming device management  
25 system of the present embodiment, the data communication

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1 between the CCU 200 and the copier 100 is carried out  
through a communication line, and the communication line  
is connected to the communication interface unit 1004 of  
the copier 100 as shown in FIG. 2. A transmitting signal  
5 on the communication line is input to or output from the  
communication interface unit 1004 of the copier 100.  
Hence, by detecting a voltage of a receiving terminal of  
the communication interface unit 1004, it is possible to  
determine whether the copier 100 has a signal from the CCU  
10 200. For example, when the voltage of the receiving  
terminal does not change over 10 minutes, it is determined  
that a separation of the signal line between the CCU 200  
and the copier 100 occurs.

As shown in FIG. 33, a receiving signal  
15 line 1004R and a transmitting signal line 1004T are  
connected at one end to the receiving terminal and a  
transmitting terminal of the communication interface unit  
1004 of the copier 100. The signal lines 1004R and 1004T  
are connected at the other ends to the CCU 200.

20 FIG. 34 shows a signal line separation  
message process performed by the CPU 1001 of the copier  
100 by using a detected voltage of the receiving terminal  
of the communication interface unit 1004 of the copier  
100. In the present embodiment, the signal line  
25 separation message process of FIG. 34 is periodically

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1 initiated by the CPU 1001 every one second.

As shown in FIG. 34, at the start of the signal line separation message process, the CPU 1001 at step S121 waits for one second. After the step S121 is performed, the CPU 1001 at step S122 determines whether a detected voltage of the receiving terminal (1004R) of the communication interface unit 1004 is in a high state.

When the result at the step S122 is negative (or the detected voltage is in a low state), the CPU 1001 at step S123 determines whether a previous detected voltage of the receiving terminal 1004R is in a high state. When the result at the step S123 is negative (or the detected voltage is in a low state), the CPU 1001 at step S124 increments a counter.

On the other hand, when the result at the step S123 is affirmative (or the detected voltage is in the high state), the detected voltage of the receiving terminal 1004R changes from the low state to the high state. In this case, the CPU 1001 at step S125 resets the counter to "0". After the step S125 is performed, the CPU 1001 performs the step S124 in which the counter is incremented.

When the result at the step S122 is affirmative (or the detected voltage is in the high state), the CPU 1001 at step S126 determines whether the

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1 previous detected voltage of the receiving terminal 1004R  
is in the low state. When the result at the step S126 is  
negative, the detected voltage of the receiving terminal  
1004R does not change. In this case, the CPU 1001  
5 performs the above step S124 in which the counter is  
incremented. On the other hand, when the result at the  
step S126 is affirmative, the detected voltage of the  
receiving terminal 1004 changes from the low state to the  
high state. In this case, the CPU 1001 performs the above  
10 steps S125 and S124.

After the step S124 is performed, the CPU  
1001 at step S127 determines whether the counter is above  
a given value. When the result at the step S127 is  
affirmative, the CPU 1001 at step S128 displays a signal  
15 line separation message on the operation part 1010 similar  
to the step S104 of FIG. 28. When the result at the step  
S127 is negative, the CPU 1001 at step S129 eliminates the  
signal line separation message from the operation part  
1010 similar to the step S107 of FIG. 28. In the present  
20 embodiment, the given value with which the counter is  
compared is preset to be equivalent to 10 minutes or  
longer.

#### 1.8.6 CONNECTION DETECTING LINE BETWEEN CCU AND COPIER

FIG. 35A and FIG. 35B show a signal line  
25 separation message process which is performed by using a

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1 connection detecting line provided between the CCU 200 and  
the copier 100.

As shown in FIG. 35A, the receiving signal  
line 1004R and the transmitting signal line 1004T are  
5 connected at one end to the receiving terminal and the  
transmitting terminal of the communication interface unit  
1004 of the copier 100. The signal lines 1004R and 1004T  
are connected at the other ends to the CCU 200. Further,  
a connection detecting line is provided between the CCU  
10 200 and the communication interface unit 1004. As shown  
in FIG. 35B, the connection detecting line is grounded on  
the side of the CCU 200, and the connection detecting line  
is connected at the other end to a terminal of the  
communication interface unit 1004. A reference voltage (5  
15 V) is supplied through a resistor (R) to the connection  
detecting line for detecting a voltage of the terminal of  
the communication interface unit 1004. The CPU 1001  
detects a voltage of the connection detecting line.

FIG. 36 shows a signal line separation  
20 message process performed by the CPU 1001 of the copier  
100 using the connect detection line between the CCU 200  
and the copier 100. In the present embodiment, the signal  
line separation message process of FIG. 36 is periodically  
initiated by the CPU 1001 every one second.

25 As shown in FIG. 36, at the start of the

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1 signal line separation message process, the CPU 1001 at  
step S131 waits for one second. After the step S131 is  
performed, the CPU 1001 at step S132 determines whether a  
detected voltage of the connection detecting line is in a  
5 high state.

When the result at the step S132 is  
negative (or the detected voltage is in a low state), it  
is determined that there is no separation of the signal  
line between the CCU 200 and the copier 100. In this  
10 case, the CPU 1001 at step S133 resets the counter to "0".  
After the step S133 is performed, the CPU 1001 at step  
S134 eliminates the signal line separation message from  
the operation part 1010 similar to the step S107 of FIG.  
28.

15 On the other hand, when the result at the  
step S132 is affirmative (or the detected voltage is in  
the high state), the CPU 1001 at step S135 increments the  
counter. After the step S135 is performed, the CPU 1001  
at step S136 determines whether the counter is larger than  
20 a given value.

When the result at the step S136 is  
affirmative (or the counter > the given value), the CPU  
1001 at step S137 displays the signal line separation  
message on the operation part 1010 similar to the step  
25 S104 of FIG. 28. When the result at the step S136 is

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1 negative (or the counter < the given value), the CPU 1001  
performs the above step S134 in which the signal line  
separation message is eliminated from the operation part  
1010 similar to the step S107 of FIG. 28. In the present  
5 embodiment, the given value with which the counter is  
compared is preset to be equivalent to 10 minutes or  
longer.

## 2. SECOND EMBODIMENT

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The present embodiment of the image forming  
10 device management system is characterized in that the  
image forming device 100 of concern effectively inhibits  
an automatic message transmission through the CCU 200 to  
the CSS 300 when a jam of the image forming device 100  
continuously occurs.

15 In the present embodiment, the structure of  
the image forming device management system, the structure  
of the image forming device 100, the structure of the CCU  
200, the structure of the CSS 300, the communication  
sequences, the data format of the messages, and the remote  
20 message transmission process are essentially the same as  
corresponding elements of the previous embodiment  
described in the above sections 1.1 through 1.7.

A description will now be given of only  
features of the second embodiment of the image forming  
25 device management system which are different from those of

1 the previous embodiment.

## 2.1 JAM DETECTION PROCESS

### 2.1.1 FIRST JAM DETECTION PROCESS

FIG. 37 shows a first jam detection process  
5 performed by the CPU 1001 the copier 100 in the present  
embodiment of the image forming device management system.  
The first jam detection process of FIG. 37 is initiated by  
the CPU 1001 every time an internal mechanical condition  
of the copier 100 changes.

10 As shown in FIG. 37, at the start of the  
first jam detection process, the CPU 1001 at step S201  
determines whether a jam of the copier 100 has occurred.  
When the jam has occurred, the CPU 1001 at step S202  
increments a continuous jam counter.

15 When no jam occurs, the CPU 1001 at step  
S207 resets the continuous jam counter to "0". After the  
step S207 is performed, the CPU 1001 ends the first jam  
detection process of FIG. 37.

After the step S202 is performed, the CPU  
20 1001 at step S203 determines whether the continuous jam  
counter is equal to a given value. When the result at the  
step S203 is affirmative, the CPU 1001 at step S204  
performs an alarm message process in which an alarm  
message is automatically transmitted through the CCU 200  
25 to the CSS 300. After the step S204 is performed, the CPU



1 1001 ends the first jam detection process of FIG. 37.

On the other hand, when the result at the  
step S203 is negative, the CPU 1001 at step S205  
determines whether the continuous jam counter is above the  
5 given value. When the result at the step S205 is  
affirmative (or the continuous jam counter > the given  
value), the CPU 1001 at step S206 sets the continuous jam  
counter so as to be equal to the given value. After the  
step S206 is performed, the CPU 1001 ends the first jam  
10 detection process of FIG. 37. In this case, the CPU 1001  
does not perform the alarm message process of the step  
S204. Therefore, it is possible to effectively inhibit  
the automatic message transmission of the copier 100 to  
the CSS 300 when a jam of the copier 100 continuously  
15 occurs.

When the result at the step S205 is  
negative (or the continuous jam counter < the given  
value), the CPU 1001 ends the first jam detection process  
of FIG. 37.

#### 20 2.1.2 SECOND JAM DETECTION PROCESS

FIG. 38 shows a second jam detection  
process performed by the CPU 1001 of the copier 100 in the  
present embodiment. The second jam detection process of  
FIG. 38 is initiated by the CPU 1001 every time an  
25 internal mechanical condition of the copier 100 changes.

1                   FIG. 39 shows the second jam detection  
process performed by the CPU 1001 of the copier 100 in the  
present embodiment. The second jam detection process of  
FIG. 39 is periodically initiated by the CPU 1001 by using  
5   a timer.

                  In the second jam detection process of FIG.  
38, the CPU 1001 at step S211 determines whether the  
copier 100 is in a jam state. When the copier 100 is in  
the jam state, the CPU 1001 at step S212 determines  
10 whether a long-period jam counter flag is equal to "0".

                  When the copier 100 is not in a jam state,  
the CPU 1001 at step S214 resets the long-period jam  
counter flag to "0". After the step S214 is performed,  
the CPU 1001 ends the second jam detection process of FIG.  
15 38.

                  When the result at the step S212 is  
negative (or the long-period jam counter flag is not equal  
to "0"), the CPU 1001 ends the second jam detection  
process of FIG. 38. On the other hand, when the result at  
20 the step S212 is affirmative (or the long-period jam  
counter flag is equal to "0"), the CPU 1001 at step S213  
sets the long-period jam counter flag to "1". After the  
step S213 is performed, the CPU 1001 ends the second jam  
detection process of FIG. 38.

25                   In the second jam detection process of FIG.

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1 39, the CPU 1001 at step S221 determines whether the long-  
period jam counter flag is equal to "1". When the result  
at the step S221 is affirmative, it is determined that the  
long-period jam counter should be set in an ON state to  
5 start counting for the detection of a period for which the  
copier 100 continues to be in the jam state. The CPU 1001  
at step S222 increments the long-period jam counter.

On the other hand, when the result at the  
step S221 is negative, it is determined that the long-  
10 period jam counter should be set in an OFF state to stop  
counting. The CPU 1001 at step S226 resets the long-  
period jam counter to "0". After the step S226 is  
performed, the CPU 1001 ends the second jam detection  
process of FIG. 39.

15 After the step S222 is performed, the CPU  
1001 at step S223 determines whether the long-period jam  
counter is above a given value. When the result at the  
step S223 is negative, the CPU 1001 ends the second jam  
detection process of FIG. 39. On the other hand, when the  
20 result at the step S223 is affirmative, the CPU 1001 at  
step S224 performs a long-period jam alarm message process  
in which a long-period jam alarm message is automatically  
transmitted through the CCU 200 to the CSS 300. After the  
step S224 is performed, the CPU 1001 at step S225 sets the  
25 long-period jam counter flag to "2" and resets the long-

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1 period jam counter to "0". After the step S225 is  
performed, the CPU 1001 ends the first jam detection  
process of FIG. 39. Therefore, it is possible to  
effectively inhibit the automatic message transmission of  
5 the copier 100 to the CSS 300 when the copier 100  
continues to be in the jam state for a long period.

## 2.2 CSS FUNCTION SETTING PROCESS

FIG. 40 shows a CSS function setting  
process performed by the CPU 1001 of the copier 100 in the  
10 present embodiment. The CSS function setting process of  
FIG. 40 is periodically initiated by the CPU 1001 by using  
a timer.

As shown in FIG. 40, at the start of the  
CSS function setting process, the CPU 1001 at step S231  
15 determines whether a CSS function flag is equal to "1".  
When the result at the step S231 is affirmative, the CPU  
at step S232 determines whether a previous CSS function  
flag is equal to "0". When the previous CSS function flag  
is equal to "0", the CPU 1001 at step S233 resets the  
20 continuous jam counter to "0", resets the long-period jam  
counter to "0", and resets the long-period jam counter  
flag to "0". After the step S233 is performed, the CPU  
1001 performs step S234.

On the other hand, when the previous CSS  
25 function flag is equal to "1", the CPU 1001 at step S234

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1 retains the previous CSS function flag in the memory of  
the copier 100. After the step S234 is performed, the CPU  
1001 terminates the CSS function setting process.

When the result at the step S231 is  
5 negative (or the CSS function flag is equal to "0"), the  
CPU 1001 at step S235 performs a remote message (R/M)  
inhibition process. After the R/M inhibition process is  
performed, the CPU 1001 of the copier 100 is inhibited  
from performing the R/M transmission to the CSS 300 or the  
10 statistical process. After the step S235 is performed,  
the CPU 1001 performs the step S234.

### 3. THIRD EMBODIMENT

The present embodiment of the image forming  
device management system is characterized in that the  
15 image forming device of concern starts an automatic  
message transmission only in an appropriate situation when  
a maintenance service of the image forming device is  
performed by a serviceman.

In the present embodiment, the structure of  
20 the image forming device management system, the structure  
of the image forming device 100, the structure of the CCU  
200, the structure of the CSS 300, the communication  
sequences, the data format of the messages, and the remote  
message transmission process are essentially the same as  
25 corresponding elements of the previous embodiment

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1 described in the above sections 1.1 through 1.7.

A description will now be given of only  
features of the third embodiment of the image forming  
device management system which are different from those of  
5 the previous embodiment.

### 3.1 SERVICEMAN MAINTENANCE SERVICE START/END MESSAGE PROCESS (FIRST EXAMPLE)

FIG. 41 shows a maintenance service  
start/end message process which is performed by the copier  
10 100 in a third embodiment of the image forming device  
management system. The maintenance service start/end  
message process of FIG. 41 is initiated when an event  
(which is either a serviceman visit message request or a  
serviceman visit end message request) occurs.

15 As shown in FIG. 41, at the start of the  
maintenance service start/end message process, the CPU  
1001 at step S301 determines whether a serviceman visit  
message is requested by the serviceman. When the result  
at the step S301 is affirmative, the CPU 1001 at step S302  
20 sets a serviceman visit flag to "1" (or an ON state).  
After the step S302 is performed, the CPU 1001 terminates  
the maintenance service start/end message process.

When the result at the step S301 is  
negative (or the serviceman visit message is not  
25 requested), the CPU 1001 at step S303 determines whether a

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1 serviceman visit end message is requested by the  
serviceman. When the result at the step S303 is  
affirmative, the CPU 1001 at step S304 resets the  
serviceman visit flag to "0" (or an OFF state). After the  
5 step S304 is performed, the CPU 1001 terminates the  
maintenance service start/end message process of FIG. 41.  
In the present embodiment, the serviceman visit flag is  
retained in the RAM 1003 which is a non-volatile (N/V)  
memory or a battery backup RAM. Hence, even when a power  
10 switch of the copier 100 is turned OFF, it is possible to  
prevent the content of the serviceman visit flag from  
being lost.

FIG. 42 shows another maintenance service  
start/end message process performed by the copier 100 in  
15 the third embodiment. The maintenance service start/end  
message process of FIG. 42 is initiated when an event  
(which is a remote message (R/M) process execute request)  
occurs.

As shown in FIG. 42, at the start of the  
20 maintenance service start/end message process, the CPU  
1001 at step S311 determines whether a received remote  
message (R/M) process execute request is related to a R/M  
process different than a replenishment part message  
process. When the result at the step S311 is negative,  
25 the CPU 1001 ends the maintenance service start/end

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1 message process of FIG. 42. When the result at the step  
S311 is affirmative, the CPU 1001 at step S312 determines  
whether the serviceman visit flag is equal to "1".

When the result at the step S312 is  
5 affirmative (or the serviceman visit flag = 1), the CPU  
1001 at step S313 cancels the R/M process execute request.  
After the step S313 is performed, the CPU 1001 terminates  
the maintenance service start/end message process of FIG.  
42.

10 When the result at the step S312 is  
negative (or the serviceman visit flag = 0), the CPU 1001  
at step S314 performs the remote message (R/M)  
transmission process in response to the execute request.  
After the step S314 is performed, the CPU 1001 terminates  
15 the maintenance service start/end message process of FIG.  
42.

### 3.2 SERVICEMAN MAINTENANCE SERVICE START/END MESSAGE PROCESS (SECOND EXAMPLE)

FIG. 43 shows a further maintenance service  
20 start/end message process which is performed by the copier  
100 in the third embodiment. The maintenance service  
start/end message process of FIG. 43 is initiated when an  
event (which is either a serviceman visit message request  
or a serviceman visit end message request) occurs.

25 As shown in FIG. 43, at the start of the



1 maintenance service start/end message process, the CPU  
1001 at step S321 determines whether the serviceman visit  
message is requested by the serviceman. When the result  
at the step S321 is affirmative, the CPU 1001 at step S322  
5 sets the serviceman visit flag to "1". After the step  
S322 is performed, the CPU 1001 terminates the maintenance  
service start/end message process of FIG. 43.

When the result at the step S321 is  
negative (or the serviceman visit message is not  
10 requested), the CPU 1001 at step S323 determines whether  
the serviceman visit end message is requested by the  
serviceman. When the result at the step S323 is  
affirmative, the CPU 1001 at step S324 resets the  
serviceman visit flag to "0". After the step S324 is  
15 performed, the CPU 1001 at step S325 resets the continuous  
jam counter to "0", resets the long-period jam counter to  
"0", and resets a door-open time counter to "0". After  
the step S325 is performed, the CPU 1001 terminates the  
maintenance service start/end message process of FIG. 43.

20 In the present embodiment, the continuous  
jam counter is used to automatically transmit a continuous  
jam message to the CSS 300 when a number of jams has  
continuously occurred on the copier 100. The long-period  
jam counter is used to automatically transmit a long-  
25 period jam message to the CSS 300 when the copier 100 is

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1 continuously in a jam state for a long period. The door-  
open time counter is used to automatically transmit a  
long-period door-open message to the CSS 300 when a door  
of the copier 100 is continuously open for a long period.

5 4. FOURTH EMBODIMENT

4.1 STRUCTURE OF SYSTEM

FIG. 44 shows a fourth embodiment of the  
image forming device management system of the present  
invention. As shown in FIG. 44, in the image forming  
10 device management system of the present embodiment, a  
plurality of image forming devices 400 (such as copiers  
401 through 405) are provided. Although the image forming  
devices 400 may be copiers, facsimiles or printers, in the  
following description, for the sake of convenience, one of  
15 the image forming devices 400 will be called the image  
forming device 400 or the copier 400 unless otherwise  
specified.

In the image forming device management  
system of FIG. 44, a data communication device DCD 420 is  
20 also provided, and each of the image forming devices 400  
is connected to the DCD 420. The DCD 420 is linked to a  
central service station CSS 460 at a remote location via a  
public switched network PSN 450. The maintenance of the  
image forming devices 400 are remotely controlled by the  
25 CSS 460 through the DCD 420 and the PSN 450 in a

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1 centralized manner. The CSS 460 in the present embodiment  
is essentially the same as the CSS 300 in the previous  
embodiments.

5 The DCD 420 in the present embodiment  
functions to selectively transmit a control signal from  
the CSS 460 to one of the image forming devices 400, and  
to transmit a message from one of the image forming  
devices 400 to the CSS 460 through the PSN 450. A power  
switch of the DCD 420 is continuously turned ON for 24  
10 hours, and the DCD 420 is capable of always communicating  
with the CSS 460 even when the image forming devices 400  
are in OFF state.

15 The interface between each copier 400 and  
the DCD 420 is provided by a multidrop connection which is  
in conformity with RS-485 standard. The communication  
sequence between each copier 400 and the DCD 420 is  
performed in accordance with basic data transmission  
procedures. The DCD 420 can communicate with one of the  
copiers 400 after a data link between the DCD 420 and the  
20 copier 400 is established by using a centralized  
polling/selecting control method. A specific device  
address can be set for each of the copiers 400 by setting  
an address setting switch of each copier 400, and a  
polling address and a selecting address can be set for  
25 each copier 400 in accordance with the specific device

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1 address.

#### 4.2 DATA COMMUNICATION DEVICE (DCD)

FIG. 45 shows a data communication device  
DCD in the fourth embodiment of the image forming device  
5 management system.

As shown in FIG. 45, the DCD 420 generally  
has a control part 421, an auto dialer 422, and a  
switching control part 423. A telephone 424 is connected  
to the switching control part 423. The control part 421  
10 controls the plurality of the image forming devices 400  
and controls receiving of a signal sent through the PSN  
450 to the DCD 420 by the CSS 460. The auto dialer 422  
functions to automatically send a call to the CSS 460 in  
accordance with a message sent by one of the image forming  
15 device 400. The switching control part 423 carries out a  
connection control to the PSN 450 and a switching of the  
DCD 420 to one of the telephone 424 and the image forming  
device 400.

In the DCD 420 of FIG. 45, the control part  
20 421 (the structure of which is not shown in FIG. 45)  
includes a CPU which executes a control program, a ROM  
which stores the control program and control data therein,  
a RAM which provides a working storage area for the CPU  
when executing the control program, a non-volatile (N/V)  
25 RAM which retains operating parameters by using a battery,

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10

### 4.3 FUNCTIONS OF SYSTEM

of FIG. 44 provides the following functions:

- 15

A description will now be given of these functions of the image forming device management system in the present embodiment.

#### 4.3.1 CONTROL OF COMMUNICATIONS FROM CSS TO COPIERS

25

1 of FIG. 44 can read out or reset a total copy count, a  
copy count of each paper tray, a copy count of each sheet  
size, a total misfeed count, a misfeed count of each sheet  
size and a misfeed count of each sheet transport position  
5 in a particular one of the image forming devices 400.

The image forming device management system  
of FIG. 44 can set or read out adjustment values of a  
controlled voltage, current, resistance and timing of each  
of various elements of each image forming device 400.

10 The image forming device management system  
of FIG. 44 can control transmission and receiving of a  
response to one of the above-mentioned controls which is  
delivered to the CSS 460 by one of the image forming  
devices 400.

15 The DCD 420 receives a command from the CSS  
460 and performs a selecting to a particular one of the  
image forming devices 400 in accordance with the command.  
When the selecting to the particular one of the image  
forming devices 400 is performed by the DCD 420, one of  
20 the above controls is carried out in the image forming  
device management system of the present embodiment.

FIG. 46 shows a selecting process performed  
to a particular one of the image forming devices 400 by  
the DCD 420 in the fourth embodiment. Suppose that a  
25 particular one of the image forming devices 400 has a

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1 device code, and a specific control code is assigned to  
indicate a predetermined selecting function.

At the start of the selecting process, the  
DCD 420 sends the specific control code and the device  
5 code through the serial CCU to the particular one of the  
image forming devices 400 (which will be called the copier  
400). The copier 400 receives the specific control code  
and the device code. After the specific control code is  
detected, the copier 400 determines whether the received  
10 device code matches a device code of the copier 400. When  
the received device code matches the device code of the  
copier 400, the copier 400 recognizes that the selecting  
of the DCD 420 is performed to the copier 400. Instead of  
the specific control code, a combination of certain codes  
15 may be used to indicate the selecting function.

When the copier 400 has a transmission data  
upon the selecting of the DCD 420 to the copier 400, the  
copier 400 outputs a busy signal. As shown in FIG. 46,  
the DCD 420 at step S401 detects whether a busy signal  
20 from the copier 400 is received. When the busy signal is  
received, the control of the DCD 420 is transferred to a  
polling process. When the copier 400 has no transmission  
data upon the selecting, the copier 400 does not output a  
busy signal. When the copier 400 determines that it can  
25 respond to the selecting, the copier 400 outputs an

1 acknowledgment (ACK). The DCD 420 at step S402 detects  
whether an ACK from the copier 400 is received. When the  
ACK is received by the DCD 420, the DCD 420 at step S405  
transmits a message to the copier 400. After the message  
5 is transmitted to the copier 400, the copier 400 outputs  
an end-of-transmission (EOT) signal. The DCD 420 at step  
S406 detects whether the EOT signal from the copier 400 is  
received. After the EOT signal is received by the DCD  
420, the selecting process is terminated and the control  
10 of the DCD 420 is transferred to the polling process.

When the copier 400 determines that it  
cannot respond to the selecting, the copier 400 outputs a  
negative acknowledgment (ACK). The DCD 420 at step S403  
detects whether a negative ACK from the copier 400 is  
15 received. When a negative ACK is not received, the DCD  
420 at step S404 detects whether a time-out period has  
elapsed since the start of the selecting. When the time-  
out period has elapsed, the selecting process is  
terminated, and the control of the DCD 420 is transferred  
20 to the polling process.

#### 4.3.2 CONTROL OF COMMUNICATIONS FROM COPIER TO CSS OR COMMUNICATIONS FROM COPIER TO DCD

When a significant failure of the copier  
400 takes place, the copier 400 immediately transmits a  
25 remote message (or an emergency message) to the DCD 420 or

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1 to the CSS 460 through the PSN 450. The remote message  
notifies that the failure of the copier 400 has occurred.

The copier 400 has a service program mode  
in addition to an image formation mode. When the image  
5 formation mode of the copier 400 is shifted to the service  
program mode by pressing a given mode shift key, the  
copier 400 immediately transmits a remote message (or an  
emergency message) to the DCD 420 or to the CSS 460  
through the PSN 450. The remote message notifies that the  
10 service program mode of the copier 400 has started.

When the current copy count of the copier  
400 reaches a predetermined number of copy sheets, the  
copier 400 immediately transmits a remote message (or an  
emergency message) to the DCD 420 or to the CSS 460  
15 through the PSN 450. The remote message notifies that a  
copy sheet replenishment is requested by the copier 400.

The DCD 420 periodically performs a polling  
to the image forming devices 400 at regular intervals so  
as to detect whether a request from any of the image  
20 forming devices 400 is sent to the DCD 420. When the  
polling to the image forming device 400 is performed by  
the DCD 420, one of the above-mentioned controls is  
carried out in the image forming device management system  
of the present embodiment.

25 FIG. 47 shows a polling process performed

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1 to the image forming devices 400 by the DCD 420. Suppose  
that the image forming devices 400 have respective device  
codes and a specific control code indicating a  
predetermined polling function is assigned.

5 At the start of the polling process, the  
DCD 420 sends the specific control code and the device  
code through the serial CCU to one of the image forming  
devices 400 (which will be called the copier 401). The  
copier 401 receives the specific control code and the  
10 device code. After the specific control code is detected,  
the copier 401 determines whether the received device code  
matches a device code of the copier 401. When the  
received device code matches the device code of the copier  
401, the copier 401 recognizes that the polling of the DCD  
15 420 is performed to the copier 401. Instead of the  
specific control code, a combination of certain codes may  
be used to indicate the predetermined polling function.

As shown in FIG. 47, the DCD 420 at step  
S411 detects whether an EOT signal from the copier 401 is  
20 received. When the EOT signal is received, the DCD 420  
terminates the polling to the copier 401, and the control  
of the DCD 420 is transferred to a polling to the copier  
402. When an EOT signal from the copier 401 is not  
received, the DCD 420 at step S412 detects whether a  
25 transmission request sent by the copier 401 is received.

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1 When the request is not received by the DCD 420, the DCD  
420 at step S413 detects whether a time-out period has  
elapsed since the start of the polling to the copier 401.  
When the time-out period has elapsed, the polling to the  
5 copier 401 is terminated, and the control of the DCD 420  
is transferred to the polling to the copier 402.

#### 4.3.3 CONTROL BY DCD

The DCD 420 in the present embodiment can  
read out a total copy count from one of the image forming  
10 devices 400. The DCD 420 can transmit a response, sent by  
one of the image forming devices 400, through the PSN 450  
to the CSS 460.

When the selecting to a particular one of  
the image forming devices 400 is performed by the DCD 420  
15 at regular intervals, the reading of a total copy count  
from the particular one of the image forming devices 400  
is carried out by the DCD 420. The DCD 420 includes a  
plurality of memories for storing respective total copy  
counts read from the image forming devices 400. The DCD  
20 420 transmits the total copy count, retained in one of the  
memories, through the PSN 450 to the CSS 460 at regular  
intervals.

#### 4.4 CONTROL PART OF IMAGE FORMING DEVICE

FIG. 48 shows a control part of each image  
25 forming device 400 in the present embodiment.

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1           As shown in FIG. 48, the control part of  
the image forming device 400 includes a controller 511  
which generally has a CPU 500, a bus 501, a real-time  
(R/T) clock 510, a ROM 502, a RAM 503, a non-volatile  
5   (N/V) RAM 504, an input/output (I/O) port 505, a first  
serial CCU 506, a second serial CCU 507, and a third  
serial CCU 508. Further, the control part of the image  
forming device 400 includes a PI (personal interface) 509.  
The elements of the controller 511 and the PI 509 are  
10 interconnected by the bus 501.

          The CPU 500 executes a control program.  
The ROM 502 stores the control program and control data  
therein. The RAM 503 provides a working storage area for  
the CPU 500 when executing the control program. The non-  
15 volatile RAM 504 retains operating parameters by using a  
battery. In the non-volatile RAM 504, transmission data  
exchanged between the image forming devices 400 and the  
CSS 460, device codes and ID codes of the image forming  
devices 400, a telephone number of the CSS 460, the number  
20 of redials, and a redial period are stored. The real-time  
(R/T) clock 510 provides a current time.

          The I/O port 505 has an output connected to  
various motors, solenoids and clutches of the image  
forming device 400, and has an input connected to various  
25 sensors and switches of the image forming device 400. The

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1 first serial CCU 506 provides an interface between the CPU  
500 and an operation part (not shown) of the image forming  
device 400. The second serial CCU 507 provides an  
interface between the CPU 500 and a document feeder (not  
5 shown) of the image forming device 400. The third serial  
CCU 508 provides an interface between the CPU 500 and a  
copy postprocess part (not shown) of the image forming  
device 400.

The PI 509 provides an interface between  
10 the CPU 500 and the DCD 420. If the processing ability of  
the CPU 500 is adequately high, the functions of the PI  
509 may be incorporated in the CPU 500.

The main functions of the PI 509 are (1)  
the monitoring of a polling or selecting of the DCD 420,  
15 (2) the processing of an acknowledgment or a negative  
acknowledgment to the DCD 420, (3) the check of  
correctness of a message transmitted to or received from  
the DCD 420, the parity check and the error detection, and  
(4) the processing of a header of a message transmitted to  
20 or received from the DCD 420.

#### 4.4.1 STRUCTURE OF PERSONAL INTERFACE

FIG. 49 shows the PI (personal interface)  
509 in the control part of the image forming device 400 in  
the present embodiment.

25 As shown in FIG. 49, the PI 509 includes a

1 CPU 600, a local bus 602, a dual-port memory 602, a  
plurality of registers 603 through 606, an input port 607,  
a device code setting switch 608, and a serial  
communication interface unit 609.

5 The CPU 600 is a one-chip microcomputer  
including a central processing unit, a ROM and a RAM. The  
CPU 600 controls the elements of the PI 509. The dual-  
port memory 602 can be accessed by both the CPU 600 of the  
PI 509 and the CPU 500 of the image forming device 500.  
10 The dual-port memory 602 is used when exchanging a message  
between the PI 509 and the controller 511. The registers  
603 through 607 are used for controlling the elements of  
the PI 509 when exchanging a message between the PI 509  
and the controller 511.

15 The device code setting switch 608 is  
provided in the PI 509 of each image forming device 400 to  
set a specific device address of the image forming device  
400. The specific device code of each image forming  
device 400 is used to identify the image forming device  
20 400 when a polling or selecting of the DCD 420 is  
performed. The serial communication interface unit 609 is  
connected to the DCD 420 or the PI 509 of a different  
image forming device 400.

#### 4.5 CONTROL PANEL

25 FIG. 50 shows a control panel 701 of the

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1 image forming device 400 in the present embodiment. The  
control panel 701 includes a control part which is  
essentially the same as the control part of the image  
forming device 400 shown in FIG. 48.

5 As shown in FIG. 50, the control panel 701  
includes ten keys 710, a clear/stop key 711, a print key  
709, an enter key 712, an interrupt key 713, a preheat/  
mode clear key 714, a mode check key 704, a screen change  
key 705, a call key 706, a registration key 707, a  
10 guidance key 708, a display contrast volume 703, and a  
character display part 702.

#### 4.5.1 CHARACTER DISPLAY PART

FIG. 51 shows the character display part  
702 in the control panel 701 of the image forming device  
15 400 of FIG. 50.

The character display part 702 of FIG. 51  
is prepared by using full-dot liquid crystal display  
elements with a matrix touch-panel switch of a transparent  
sheet material attached thereto. In the matrix touch-  
20 panel switch, a number of touch sensors (provided for each  
of 8 x 8 picture elements) are internally provided. A key  
of the character display part 702 is turned ON or OFF by  
pressing or touching it. In addition, indication of an  
operating state of the image forming device 400, such as  
25 "copy possible", "during coping" or "no paper", is

1 displayed on the character display part 702 of the image  
forming device 400.

#### 4.6 DATA FORMAT OF MESSAGES

FIG. 52 shows a data format of a message  
5 transmitted between the CSS 460 and the DCD 420 in the  
fourth embodiment.

As shown in FIG. 52, the message includes  
an SYN 910, an SOH 920, an SN 930, an STX 940, a text 950,  
an ETB or ETX 960, and an LRC 970. The text 950 is  
10 exchanged between the CSS 460 and the DCD 420 together  
with the SYN 910, the SOH 920, the SN 930, the STX 940,  
the ETB or ETX 960, and the LRC 970. The SN (serial  
number) 930 indicates a transmission block number of the  
message within blocks of one transmission. One of numeral  
15 values "00" through "99" is sequentially assigned to the  
SN 930 of each block.

The text 950 includes an ID code 951, a  
type code 952, and a number of records 953 (including  
records 953(1) through 953(N)). Each of the records 953  
20 includes a parameter code 955, the number of digits 956,  
and a data 957. The ID code 951 is used to identify a  
particular one of the image forming device 400 and the DCD  
420. The type code 952 includes a process code, and a  
text originating device ID and a text receiving device ID  
25 added thereto. The type code 952 is predetermined as in

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1 the following table.

TABLE 1:

5	-----		
	CODE	PROCESS NAME	DESCRIPTION
-----			
10	30	EMERGENCY AUTO CALL	R/M TRANSMISSION IN CASE OF EMERGENCY
	31	MANUAL CALL	R/M TRANSMISSION WHEN MANUAL SWITCH IS TURNED ON
	32	ALARM MESSAGE	R/M TRANSMISSION WHEN ALARM MESSAGE OCCURS
15	22	BLOCK BILLING PROCESS	R/M TRANSMISSION WHEN A CONTRACT COPY COUNT IS REACHED
	02	READ PROCESS	READING OF DATA FROM COPIER
	04	WRITE PROCESS	WRITING OF DATA TO COPIER
20	03	EXECUTE PROCESS	EXECUTION OF TEST BY R/M
	08	DEVICE CODE	PROCESS TO CHECK COMMUNICA-
		CHECK	TION FUNCTION
-----			

Each record 953, including the parameter code 955, the number of digits 956 and the data 957, is predetermined as in the following table.

25 TABLE 2:

1

5

10

15

20

25

CODE

DESCRIPTION

PARAMETER CODE

INDICATES A KIND OF OPERATING  
PARAMETER OF A COPIER

NO. OF DIGITS

INDICATES A LENGTH OF DATA  
WHICH FOLLOWS

DATA

THE CONTENTS OF EACH RECORD

As shown in FIG. 52, a separator 954 (which is a semicolon) is inserted between the ID code 951 and the type code 952, between the type code 952 and the first record 953(1), and between the respective records 953.

FIG. 53 shows a data format of a message transmitted between the DCD 420 and the PI 509.

As shown in FIG. 53, the message includes the SYN 910, the SOH 920, the SN 930, the STX 940, a text 950, the ETB or ETX 960, and the LRC 970. The text 950 includes a device code 958, a process code 959, and a number of records 953 (including records 953(1) through 953(N)). The device code 958 is a specific device address of each of the copiers 400 set by the device code setting switch 608 of the PI 509 of each image forming device 400. The correlation between the device code 958 and the ID code 951 is retained in the non-volatile RAM of the DCD

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1 420. When each image forming device 400 is installed on a  
user site, the device code 958 is read from the image  
forming device 400 and transmitted to the DCD 420.

The process code 959 is the same as the  
5 process code included in the type code 952. The process  
code 959 is produced by eliminating the text originating  
device ID and the text receiving device ID from the type  
code 952. Each of the records 953 in the message of FIG.  
53 includes the parameter code 955, the number of digits  
10 956, and the data 957, similar to that in the message of  
FIG. 52.

FIG. 54 shows a data format of a message  
transmitted between the PI 509 and the image forming  
device 400 (or the controller 511). As shown in FIG. 54,  
15 the message is produced by eliminating the header, the  
device code and the parity portion from the message of  
FIG. 53 transmitted between the DCD 420 and the PI 509.  
4.7 BLOCK BILLING FUNCTION

The block billing function is provided for  
20 the image forming device management system to establish a  
charge for a predetermined number of copy sheets as a  
contract for use of each image forming device 400. To  
attain the block billing function, it is necessary that a  
precise copy count at a start of the block billing of each  
25 image forming device 400 and a precise copy count at an

1 end of the block billing be safely managed by the image  
forming device management system.

#### 4.7.1 BLOCK BILLING START PROCESS

5 In the present embodiment, each of the  
image forming devices 400 receives a non-resettable copy  
count and a remote message cycle, both transmitted to the  
image forming device 400 by the CSS 460 through the DCD  
420 at a start of the block billing contract. The non-  
resettable copy count indicates a predetermined number of  
10 copy sheets related to the block billing contract for use  
of the image forming device 400. The remote message cycle  
indicates a frequency at which the image forming device  
400 transmits a remote message (including a block billing  
start copy count) to the CSS 460. The transmission of the  
15 non-resettable copy count and the remote message cycle to  
the image forming device 400 is carried out by using the  
selecting of the DCD 420 to the image forming device 400.

FIG. 55 shows a data format of a remote  
message transmitted between the PI 509 and the image  
20 forming device 400 when the image forming device 400  
receives the remote message (including a block billing  
start copy count) from the CSS 460.

As shown in FIG. 55, the data format of the  
message is essentially the same as that of the message of  
25 FIG. 54. The message of FIG. 55 includes a process code

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"BETTY" 10956160

1 1201, a number of records 1202 (including records 1202(1)  
through 1202(N)), and the ETB or ETX. Each record 1202  
includes a parameter code 1203, the number of digits 1204,  
and a data 1205.

5 The process code 1201 is set at "04" as  
listed in the TABLE 1 above. The parameter code 1203 of  
the record 1202(1) indicates a kind of an operating  
parameter (or a block billing start copy count). The  
number of digits 1204 is set at "08" in ASCII code. The  
10 data 1205 is set at the block billing start copy count,  
and this data is written to the memory of the image  
forming device 400 as the non-resettable copy count. The  
record 1202(1) carrying the non-resettable copy count is  
transmitted from the CSS 460 through the PI 509 to the  
15 image forming device 400. Similarly, the record 1202(2)  
carrying the remote message cycle is transmitted from the  
CSS 460 through the PI 509 to the image forming device  
400.

The non-resettable copy count and the  
20 remote message cycle, both transmitted to the image  
forming device 400 by the CSS 460 through the DCD 420 at a  
start of the block billing contract, are processed by the  
CPU 500 of the image forming device 400 and stored in the  
non-volatile RAM 504. Hence, the CPU 500 acts as a  
25 receiving means for receiving the non-resettable copy

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1 count and the remote message cycle, and the non-volatile  
RAM 504 acts as a first storage means for storing the non-  
resettable copy count and the remote message cycle.  
Further, the CPU 500 acts as a control means for setting  
5 the image forming device 400 in a remote message enable  
state when a difference between a current copy count and  
the received copy count reaches an integral multiple of  
the remote message cycle. The CPU 500 acts as a remote  
message means for transmitting a remote message through  
10 the DCD 420 to the CSS 460 after the image forming device  
400 is set in the remote message enable state. The non-  
volatile RAM 504 acts as a second storage means for  
storing a current copy count that is incremented every  
time an image formation of one copy sheet is performed by  
15 the image forming device 400.

FIG. 56 shows a block billing process  
performed by the CPU 500 of the image forming device 400  
in the present embodiment.

In the present embodiment, suppose that a  
20 paper-out (P/O) sensor (not shown) for sensing an ejection  
of a copy sheet out of the image forming device 400 is  
connected to an input of the I/O port 505, and outputs a  
P/O sensor signal to the CPU 500 via the I/O port 505.

As shown in FIG. 56, at the start of the  
25 block billing process, the CPU 500 at step 1301 determines

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1 whether the image forming device 400 is in an image forming state. When the image forming device 400 is in an image forming state, the CPU 500 at step 1302 determines whether the P/O sensor signal is at its falling edge.

5 When the result at the step 1302 is affirmative, the CPU 500 at step 1303 increments the current copy count of the image forming device 400. The CPU 500 at step 1304 determines whether a difference between the current copy count and the received copy count (or the block billing

10 start copy count) reaches an integral multiple of the remote message cycle.

In the step 1304, it is determined whether the following calculation (or the division) results in an integer:

15 (the current copy count - the received copy count)  
/(the remote message cycle) (1)

When the result at the step 1304 is affirmative, the CPU 500 at step 1305 sets a remote message (R/M) flag to "1" (or an ON state). After the

20 step 1305 is performed, the CPU 500 ends the block billing process of FIG. 56.

When the result at the step 1301 is negative (or the image forming device 400 stops the image formation), the CPU 500 at step 1306 determines whether

25 the R/M enable flag is equal to "1". When the result at

1 the step 1306 is affirmative, the CPU 500 at step 1307  
transmits a remote message through the DCD 420 to the CSS  
460. The transmission of the message is carried out by  
using a selecting of the DCD 420. After the step 1307 is  
5 performed, the CPU 500 at step 1308 resets the R/M enable  
flag to "0" (or an OFF state). After the step 1308 is  
performed, the CPU 500 ends the block billing process.

In the block billing process of FIG. 56,  
the image forming device 400 is unable to perform the  
10 automatic message transmission during the image formation.  
However, if the ability of the image forming device 400,  
including the CPU 500, is adequately high, it is possible  
to perform the automatic message transmission even when  
the image forming device 400 is in the image forming  
15 state. In such a case, the setting of the R/M enable flag  
to "1" or "0" is not needed.

#### 4.7.2 DATA FORMAT OF REMOTE MESSAGE

FIG. 57 shows a data format of a remote  
message transmitted between the PI 509 and the image  
20 forming device 400 when the step 1307 in the block billing  
process of FIG. 56 is performed. The data format of the  
remote message is essentially the same as that of the  
message of FIG. 54.

As shown in FIG. 57, the remote message  
25 includes a process code 1401, a number of records 1402



1 (including records 1402(1) through 1402(N)), and the ETB  
or ETX. Each record 1402 includes a parameter code 1403,  
the number of digits 1404, and a data 1405.

5 The process code 1401 is set at "22" as  
listed in the TABLE 1 above. The parameter code 1403 of  
the record 1402(1) indicates a kind of an operating  
parameter (or a block billing start copy count). The  
number of digits 1404 is set at "01" in ASCII code. The  
data 1405 is set at the block billing start copy count is  
10 set at "1", and this data indicates an occurrence of a  
remote message. The data 1405 when the automatic message  
transmission is performed is always set at "1", and "0" is  
not used for the data 1405. The records 1402(2) through  
1402(N) may be omitted if they are not needed.

15 A description of the data formats of a  
remote message transmitted between the PI 509 and the DCD  
420 and a remote message transmitted between the DCD 420  
and the CSS 460 will be omitted. Similar to the data  
format of the remote message of FIG. 57, the data formats  
20 of these remote messages may be defined.

#### 4.7.3 BLOCK BILLING END PROCESS

A block billing end process performed by  
the CPU 500 of the image forming device 400 in the present  
embodiment is essentially the same as the block billing  
25 process of FIG. 56 except that the block billing start

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1 copy count of the latter process is substituted by a block  
billing end copy count.

At the start of the block billing end  
process, the CPU 500 at step 1301 determines whether the  
5 image forming device 400 is in an image forming state.  
When the image forming device 400 is in an image forming  
state, the CPU 500 at step 1302 determines whether the P/O  
sensor signal is at its falling edge. When the result at  
the step 1302 is affirmative, the CPU 500 at step 1303  
10 increments the current copy count of the image forming  
device 400. The CPU 500 at step 1304 determines whether a  
difference between the current copy count and the received  
copy count (or the block billing end copy count) reaches  
an integral multiple of the remote message cycle.

15 In the step 1304, it is determined whether  
the following calculation (or the division) results in an  
integer:

$$\frac{(\text{the received copy count} - \text{the current copy count})}{(\text{the remote message cycle})} \quad (2)$$

20 When the result at the step 1304 is  
affirmative, the CPU 500 at step 1305 sets the remote  
message (R/M) flag to "1" (or the ON state). After the  
step 1305 is performed, the CPU 500 terminates the block  
billing end process.

25 When the result at the step 1301 is

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1 negative (or the image forming device 400 stops the image  
formation), the CPU 500 at step 1306 determines whether  
the R/M enable flag is equal to "1". When the result at  
the step 1306 is affirmative, the CPU 500 at step 1307  
5 transmits a remote message through the DCD 420 to the CSS  
460. The transmission of the remote message is carried  
out by using a selecting of the DCD 420. After the step  
1307 is performed, the CPU 500 at step 1308 resets the R/M  
enable flag to "0" (or the OFF state). After the step  
10 1308 is performed, the CPU 500 terminates the block  
billing end process.

According to the block billing process and  
the block billing end process in the above-described  
embodiment, the image forming device 400 is set in the  
15 remote message enable state only when the difference  
between the current copy count and the received copy count  
reaches an integral multiple of the remote message cycle.  
The CPU 500 transmits a remote message to the CSS 460  
after the image forming device 400 is set in the remote  
20 message enable state. It is possible for the image  
forming device management system of the present embodiment  
to efficiently carry out a precise block billing function.

FIG. 58 shows another data format of the  
remote message transmitted between the PI 509 and the  
25 image forming device 400 when the step 1307 in the block

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1 billing process of FIG. 56 is performed. The data format  
of the remote message is essentially the same as that of  
the remote message of FIG. 57.

As shown in FIG. 58, the record 1402(1) of  
5 this remote message is the same as that of the remote  
message of FIG. 57. A parameter code 1406 of the record  
1402(2) indicates a kind of an operating parameter (or the  
current copy count). The number of digits 1407 of the  
record 1402(2) is set at "08" in ASCII code. A data 1408  
10 of the record 1402(2) is set at the current copy count.  
The records 1402(3) through 1402(N) may be omitted if they  
are not needed.

A description of the data formats of a  
remote message transmitted between the PI 509 and the DCD  
15 420 and a remote message transmitted between the DCD 420  
and the CSS 460 will be omitted. Similar to the data  
format of the remote message of FIG. 58, the data formats  
of these remote messages may be defined.

#### 4.8 DISPLAY OF USER-PROGRAM MODE INDICATION

20 In the present embodiment, at least one of  
the current copy count, the contract start copy count (or  
the block billing start copy count) and the contract end  
copy count (or the block billing end copy count) is  
displayed on the character display part 702 in the control  
25 panel 701 of the image forming device 400. It is possible

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1 for the present embodiment to provide an easy-to use  
management operation for the user of the image forming  
device 400.

FIG. 59 shows a user-program mode  
5 indication (or a block billing indication) displayed on  
the character display part 702 in the control panel 701 of  
the image forming device 400.

The image forming device 400 in the present  
embodiment may be shifted to a user-program mode, and  
10 during the user-program mode the user can perform a  
setting of a special operating parameter of the image  
forming device 400 which cannot be performed in the image  
formation mode. For example, the image formation mode of  
the image forming device 400 may be shifted to the user-  
15 program mode when the user manually inputs a secret number  
to the CPU 500 by pressing the ten keys 710, the  
clear/stop key 711, the enter key 712 and/or the  
preheat/mode clear key 714. Alternatively, a block  
billing key for the above purpose may be provided in the  
20 control panel 701 of the image forming device 400 or may  
be displayed on the character display part 702 of the  
image forming device 400.

In the example of the block billing  
indication shown in FIG. 59, the current copy count and  
25 the contract end copy count are displayed on the character

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1 display part 702 in the control panel 701 of the image  
forming device 400. The current copy count and the  
contract end copy count are read from the non-volatile RAM  
504 by the CPU 500, and they are transmitted through a  
5 display control part (not shown) to the character display  
part 702 by the CPU 500, so that the block billing  
indication is displayed.

#### 5. FIFTH EMBODIMENT

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The present embodiment of the image forming  
10 device management system is characterized in that the CSS  
460 transmits a parameter code, indicating a kind of a  
particular one of the operating parameters, through the  
DCD 420 to the image forming device 400, and the image  
forming device 400 determines, in response to an access  
15 request, an absolute address of the memory of the image  
forming device 400 by the parameter code, and accesses the  
particular one of the operating parameters in the memory  
at the absolute address.

The present embodiment is characterized in  
20 that the image forming devices are of different models and  
share a common parameter code indicating an identical kind  
for the operation parameters of the individual image  
forming devices regardless of the model of each image  
forming device.

25 In the present embodiment, the structure of

1 the image forming device management system, the structure  
of the image forming device 400, the structure of the DCD  
420, the structure of the CSS 460, the communication  
sequences, and the data format of messages are essentially  
5 the same as corresponding elements of the previous  
embodiment described in the above sections 4.1 through  
4.6. A description will now be given of only features of  
the fifth embodiment of the image forming device  
management system which are different from those of the  
10 previous embodiment.

#### 5.1 STRUCTURE OF SYSTEM

FIG. 60 shows a fifth embodiment of the  
image forming device management system.

The system of FIG. 60 is different from the  
15 system of FIG. 44 in that two DCD devices 420 and 421 are  
provided, one group 400 of image forming devices 401 and  
402 is connected through the DCD 420 to the CSS 460, and  
another group 410 of image forming devices 411 through 413  
is connected through the DCD 421 to the CSS 460.  
20 Hereinafter, one of these image forming devices will be  
called the image forming device 400 or the copier 400 for  
the sake of convenience. Other structure of the system of  
FIG. 60 are essentially the same as that of the system of  
FIG. 44. The elements of the system of FIG. 60 which are  
25 the same as corresponding elements in FIG. 44 are

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1 designated by the same reference numerals, and a  
description thereof will be omitted.

## 5.2 MEMORY ADDRESS

In the image forming device 400, a  
5 parameter code table is stored in the ROM 502. In  
accordance with the data format of the message shown in  
FIG. 54, respective memory addresses of the ROM 502 for  
storing the operating parameters of the image forming  
device 400 are predetermined. In the parameter code  
10 table, respective parameter codes corresponding to the  
memory addresses of the ROM 502 are provided, and each  
parameter code indicates a kind of a particular one of the  
operating parameters.

FIG. 61 shows a parameter code stored in  
15 the ROM 502 of the image forming device 400. In the  
present embodiment, the image forming devices are of  
different models and share a common parameter code  
indicating an identical kind for the operation parameters  
of the individual image forming devices regardless of the  
20 model of each image forming device.

## 5.3 COMMUNICATION SEQUENCES

FIG. 62A and FIG. 62B show respective  
communication sequences when a read request and a write  
request are transmitted to the image forming device 400 of  
25 concern by the CSS 460.

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1           In each of the read request (FIG. 62A) and  
the write request (FIG. 62B), the copier 400 of concern  
receives an access request sent by the CSS 460. By making  
reference to the parameter code table of the ROM 502 by a  
5   parameter code of the access request, the copier 400  
determines an absolute address of the memory of the copier  
400 by the parameter code, and accesses a particular one  
of the operating parameters in the memory at the absolute  
address. In the case of the read request, the copier 400  
10   reads out the operating parameter from the memory at the  
absolute address, and transmits the read data through the  
DCD 420 to the CSS 460. In the case of the write request,  
the copier 400 writes data of the write request to the  
memory at the absolute address, and transmits the written  
15   data through the DCD 420 to the CSS 460.

#### 5.4 CONTROL PROCESS OF COPIER

##### 5.4.1 MAIN CONTROL PROCESS

FIG. 63 shows a main control process  
performed by the CPU 500 of the image forming device 400  
20   when an access request is transmitted to the image forming  
device 400 by the CSS 460. The main control process of  
FIG. 63 is essentially the same as the process of FIG. 20  
except that the step S41 of the process of FIG. 20 is  
eliminated from the main control process of FIG. 63.

##### 25   5.4.2 READ SUB-PROCESS

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1                   FIG. 64 shows a read sub-process S636 in  
the main control process of FIG. 63. As shown in FIG. 64,  
the CPU 500 at step S641 gets a parameter code from the  
received read request. The CPU 500 makes reference to the  
5   parameter code table of the ROM 502 of the copier 400 by  
the parameter code. The CPU 500 at step S642 determines  
whether the received parameter code matches the parameter  
code table of the ROM 502. When the received parameter  
code matches the parameter code table, the CPU 500 at step  
10   S643 determines whether the received parameter code  
indicates a readable operating parameter by detecting a  
corresponding item of the parameter code in the parameter  
code table. When the received parameter code indicates a  
readable operating parameter, the CPU 500 at step S644  
15   determines a memory address from the parameter code of the  
received read request by detecting a corresponding item of  
the parameter code in the parameter code table. The CPU  
500 at step S645 transmits the data, read from the memory  
at the memory address, to the DCD 420. When the received  
20   parameter code does not indicate a readable operation  
parameter, the CPU 500 at step S646 transmits an error  
code to the DCD 420.

#### 5.4.3 WRITE SUB-PROCESS

FIG. 65 shows a write sub-process S637 in  
25   the main control process of FIG. 63. As shown in FIG. 65,

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1 the CPU 500 at step S651 gets a parameter code from the  
received write request. The CPU 500 makes reference to  
the parameter code table of the ROM 502 of the copier 400  
by the parameter code. The CPU 500 at step S652  
5 determines whether the received parameter code matches the  
parameter code table of the ROM 502. When the received  
parameter code matches the parameter code table, the CPU  
500 at step S653 determines whether the received parameter  
code indicates a writable operating parameter by detecting  
10 a corresponding item of the parameter code in the  
parameter code table. When the received parameter code  
indicates a writable operating parameter, the CPU 500 at  
step S654 gets a writing data from the received write  
request. The CPU 500 at step S655 determines whether the  
15 writing data is in an effective data range. When the  
writing data is in the effective data range, the CPU 500  
at step S656 determines a memory address from the  
parameter code of the received write request by detecting  
a corresponding item of the parameter code in the  
20 parameter code table. The CPU 500 at step S657 writes the  
writing data to the memory at the memory address. The CPU  
500 at step S658 transmits the written data (or the  
operating parameter), which is written to the memory at  
the memory address, to the DCD 420. When the received  
25 parameter code does not indicate a writable operation

1 parameter, the CPU 500 at step S659 transmits an error  
code to the DCD 420. When the writing data is not in the  
effective data range, the CPU 500 performs the step S659.

## 6. SIXTH EMBODIMENT

5 The present embodiment of the image forming  
device management system is characterized in that the CSS  
460 can manage an accurate maintenance service start time  
of each of the image forming devices 400. In the present  
embodiment, the basic structure of the image forming  
10 device management system is essentially the same as that  
of the previous embodiment described in the above sections  
4.1 through 4.6. A description will now be given of only  
features of the sixth embodiment of the image forming  
device management system which are different from those of  
15 the previous embodiment.

### 6.1 CONTROL PANEL

FIG. 66 shows a control panel of the image  
forming device 400 in the present embodiment. As shown in  
FIG. 66, the control panel includes ten keys 71, a  
20 clear/stop key 72, a print key 73, an enter key 74, an  
interrupt key 75, a preheat/mode clear key 76, a mode  
check key 77, a screen change key 78, a call key 79, a  
registration key 80, a guidance key 81, a display contrast  
volume 82, and a character display part 83.

25 The character display part 83 is prepared

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1 by using full-dot liquid crystal display elements with a  
matrix touch-panel switch of a transparent sheet material  
attached thereto. In the matrix touch-panel switch, a  
number of touch sensors (provided for each of 8 x 8  
5 picture elements) are internally provided. A key of the  
character display part 83 is turned ON or OFF by pressing  
or touching it. When a power switch of the copier 400 is  
turned ON, an image formation mode (copy mode) indication  
is displayed on the character display part 83. In  
10 addition, indication of an operating state of the image  
forming device 400, such as "copy possible", "during  
coping" or "no paper", is displayed on the character  
display part 83 of the image forming device 400.

FIG. 67 shows an image formation mode

15 indication (or a copy mode indication) displayed on a  
character display part 83 of the control panel of the  
image forming device of FIG. 66.

As shown in FIG. 67, the copy mode  
indication includes a message display area 91, a set  
20 display area 92, a tray selection key/copy size display  
area 93, an auto sheet selection (ASS) key 94, a density  
adjusting key 95, an auto density selection (ADS) key 96,  
an equal-size (E/S) key 97, an enlarge (E/L) key 98, and a  
reduce (R/D) key 99.

25 Further, in the copy mode indication of

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1 FIG. 67, a zoom key 83-100, a sheet-designated sizing  
(SDS) key 83-101, a set of duplex mode keys 83-102, a  
duplex mode message area 83-103, a pair of page-offset  
(P/O) keys 83-104, a page-offset mode message area 83-105,  
5 a shift function select key 83-106, a staple select key  
83-107 (one place), a staple select key 83-108 (two  
places), and a maintenance end message key 83-109. When  
requesting a transmission of a maintenance end message to  
the CSS 460, the maintenance end message key 83-109 is  
10 pressed or turned ON by the user. The maintenance end  
message key 83-109 may be displayed only when needed, and  
it may be eliminated when unneeded. In addition, the  
maintenance end message key 83-109 may be displayed only  
when the copier 400 is shifted to a service program mode,  
15 which will be described below.

## 6.2 SERVICE PROGRAM MODE PROCESS

Each image forming device 400 in the  
present embodiment may be shifted to a service program  
mode, and during the service program mode a serviceman can  
20 perform a maintenance service of the image forming device  
400, such as setting or adjustment of the operating  
parameters of the image forming device 400 or displaying  
of the statistical data of the image forming device 400,  
which cannot be performed in the image formation mode.  
25 For example, the image forming device 400 may be shifted

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1 into the service program mode when the serviceman manually  
inputs a secret number (not available to the user) to the  
CPU 500 by pressing the ten keys 71 and/or the enter key  
74 in a predetermined sequence.

5 FIG. 68 shows a service program (SP) mode  
indication displayed on the character display part 83 of  
the control panel of the image forming device of FIG. 66  
during the service program mode.

As shown in FIG. 68, the service program  
10 (SP) mode indication on the character display part 83  
includes an adjust mode shift key 111, a test mode shift  
key 112, a data output mode shift key 113, a special  
specification set mode shift key 114, a remote message  
test mode shift key 115, and a counter mode shift key 116.

15 In the present embodiment, when the ten  
keys 71 and/or the enter key 74 of the control panel of  
the image forming device 400 are pressed or turned ON in a  
predetermined sequence by a serviceman, the image forming  
device 400 is shifted to the service program mode. When  
20 the image forming device 400 is shifted to the service  
program mode, the service program mode indication  
(including a maintenance end message key) is displayed on  
the character display part 83 as shown in FIG. 68. At the  
same time, the image forming device 400 automatically  
25 transmits a maintenance service start message through the

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1 DCD 420 to the CSS 460. The maintenance service start  
message notifies the CSS 460 of the start of a maintenance  
service of the image forming device 400 by the serviceman.  
FIG. 74A shows a data format of the maintenance service  
5 start message transmitted to the CSS 460 by the image  
forming device 400.

During the service program mode, the  
maintenance service of the image forming device 400 is  
performed by the serviceman. When the maintenance service  
10 is complete, the maintenance end message key of the  
service program mode indication on the character display  
part 83 by the serviceman. At this time, the image  
forming device 400 automatically transmits a maintenance  
service end message through the DCD 420 to the CSS 460.  
15 The maintenance service end message notifies the CSS 460  
of the end of the maintenance service of the image forming  
device 400 by the serviceman. FIG. 74B shows a data  
format of the maintenance service end message transmitted  
to the CSS 460 by the image forming device 400.

20 According to the present embodiment, the  
CSS 460 can manage an accurate maintenance service  
start/end time of each of the image forming devices 400.

### 6.3 SERVICE PROGRAM MODE SHIFT CHECK PROCESS

FIG. 69 shows a maintenance service start  
25 message process performed by the CPU 500 of the image

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1 forming device 400 in the present embodiment.

As shown in FIG. 69, the CPU 500 at step  
S691 determines whether a service program mode shift key  
is pressed or turned ON by the serviceman (or determines  
5 whether the ten keys 71 and/or the enter key 74 of the  
control panel of the image forming device 400 are pressed  
or turned ON in the predetermined sequence by the  
serviceman). When the result at the step S691 is  
affirmative, the CPU 500 at step S692 shifts the image  
10 forming device 400 to the service program mode. In the  
step S692, the CPU 500 displays the service program mode  
indication as shown in FIG. 68 on the character display  
part 83 of the control panel. In the present embodiment,  
the service program mode indication includes the  
15 maintenance end message key (not shown in FIG. 68).

After the step S692 is performed, the CPU  
500 at step S693 determines whether a maintenance run flag  
is equal to "1". When the result at the step S693 is  
negative (or the maintenance run flag = "0"), the CPU 500  
20 at step S694 transmits a maintenance service start message  
through the DCD 420 to the CSS 460. The maintenance  
service start message notifies the CSS 460 of the start of  
the maintenance service of the image forming device 400.  
After the step S694 is performed, the CPU 500 at step S695  
25 sets the maintenance run flag to "1". After the step S695

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1 is performed, the CPU 500 ends the maintenance service  
start message process of FIG. 69.

When the result at the step S693 is  
affirmative (the maintenance run flag = "1"), the CPU 500  
5 ends the maintenance service start message process of FIG.  
69. Hence, at this time, the CPU 500 inhibits the  
automatic transmission of the maintenance service start  
message to the CSS 460. In this case, the automatic  
transmission of the maintenance service start message is  
10 already performed but the service program mode shift key  
mentioned above is pressed or turned ON again by the  
serviceman. Also, the automatic transmission of a  
maintenance service end message is not yet performed by  
pressing the maintenance end message key. Hence, it is  
15 possible for the image forming device management system of  
the present embodiment to manage an accurate maintenance  
service start time of the image forming device 400.

#### 6.4 MAINTENANCE SERVICE END MESSAGE PROCESS

FIG. 70 shows a maintenance service end  
20 message process performed by the CPU 500 of the image  
forming device 400 in the present embodiment. The  
maintenance service end message process of FIG. 70 is  
initiated when the maintenance end message key of the  
service program mode indication on the character display  
25 part 83 is pressed or turned ON by the serviceman.

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1                   As shown in FIG. 70, the CPU 500 at step  
S702 transmits a maintenance service end message through  
the DCD 420 to the CSS 460. After the step S701 is  
performed, the CPU 500 at step S702 rests the maintenance  
5   run flag to "0". The image forming device management  
system of the present embodiment can prevent the  
maintenance of a maintenance service end time from being  
degraded even when the serviceman fails to request the  
transmission of the maintenance service end message to the  
10   CSS 460. Hence, it is possible for the image forming  
device management system of the present embodiment to  
manage an accurate maintenance service end time of each of  
the image forming devices 400.

#### 6.5 MAINTENANCE SERVICE START MESSAGE PROCESS

15                  FIG. 71 shows a maintenance service start  
message key displayed on the character display part 83 of  
the control panel of the image forming device 400.

In the present embodiment, when the ten  
keys 71 and/or the enter key 74 of the control panel of  
20   the image forming device 400 are pressed or turned ON in a  
predetermined sequence by a serviceman, the maintenance  
service start indication (including the maintenance start  
message key 120) is displayed on the character display  
part 83 as shown in FIG. 71. When the maintenance start  
25   message key 120 in the maintenance service start

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1 indication, displayed on the character display part 83, is  
pressed or turned ON by the serviceman, the image forming  
device 400 is shifted to the service program mode. When  
the image forming device 400 is shifted to the service  
5 program mode, the service program mode indication  
(including the maintenance end message key) is displayed  
on the character display part 83 as shown in FIG. 68. At  
the same time, the image forming device 400 automatically  
transmits a maintenance service start message through the  
10 DCD 420 to the CSS 460. For example, FIG. 74A shows a  
data format of the maintenance service start message  
transmitted to the CSS 460 by the image forming device 400  
at this time. The maintenance service start message  
notifies the CSS 460 of the start of the maintenance  
15 service of the image forming device 400 by the serviceman.  
It is possible for the image forming device management  
system of the present embodiment to manage an accurate  
maintenance service start time of each of the image  
forming devices 400.

20 During the service program mode, the  
maintenance service of the image forming device 400 is  
performed by the serviceman. When the maintenance service  
is complete, the maintenance end message key of the  
service program mode indication on the character display  
25 part 83 is pressed or turned ON by the serviceman. At

1 this time, the image forming device 400 automatically  
transmits a maintenance service end message through the  
DCD 420 to the CSS 460. The maintenance service end  
message notifies the CSS 460 of the end of the maintenance  
5 service of the image forming device 400 by the serviceman.  
For example, FIG. 74B shows a data format of the  
maintenance service end message transmitted to the CSS 460  
by the image forming device 400 at this time.

According to the present embodiment, the  
10 CSS 460 can manage an accurate maintenance service  
start/end time of each of the image forming devices 400.

FIG. 72 shows a maintenance service start  
message process performed by the CPU 500 of the image  
forming device 400 in the present embodiment.

15 As shown in FIG. 72, the CPU 500 at step  
S721 determines whether the service program mode shift key  
is pressed or turned ON by the serviceman (or determines  
whether the ten keys 71 and/or the enter key 74 of the  
control panel of the image forming device 400 are pressed  
20 or turned ON in the predetermined sequence by the  
serviceman). When the result at the step S721 is  
affirmative, the CPU 500 at step S722 determines whether  
the maintenance run flag is equal to "1".

When the result at the step S722 is  
25 negative (or the maintenance run flag = 0), the CPU 500 at

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1 step S723 displays the maintenance service start  
indication of FIG. 71 on the character display part 83.  
As described above, the maintenance service start  
indication includes the maintenance start message key 120.

5 After the step S723 is performed, the CPU 500 at step S724  
determines whether the maintenance start message key 120  
is pressed or turned ON by the serviceman. When the  
maintenance start message key 120 is turned ON, the CPU  
500 at step S725 transmits the maintenance service start  
10 message through the DCD 420 to the CSS 460. After the  
step S725 is performed, the CPU 500 at step S726 sets the  
maintenance run flag to "1". After the step S726 is  
performed, the CPU 500 performs step S727 which will be  
described below.

15 When the result at the step S721 is  
negative (or the service program mode shift key is not  
turned ON), the CPU 500 performs step S727 which will be  
described below, and does not perform the steps S723-S726.

When the result at the step S722 is  
20 affirmative (or the maintenance run flag = "1"), the CPU  
500 at step S727 shifts the image forming device 400 into  
the service program mode. In the step S727, the CPU 500  
displays the service program mode indication of FIG. 68 on  
the character display part 83 of the control panel. In  
25 the present embodiment, the service program mode

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1 indication includes the maintenance end message key (not  
shown in FIG. 68). After the step S727 is performed, the  
CPU 500 ends the maintenance service start message process  
of FIG. 72. Hence, the CPU 500 inhibits the automatic  
5 transmission of the maintenance service start message to  
the CSS 460 when the maintenance run flag is equal to "1".  
In this case, the automatic transmission of the  
maintenance service start message is already performed but  
the service program mode shift key mentioned above is  
10 pressed or turned ON again by the serviceman. Also, the  
automatic transmission of a maintenance service end  
message is not yet performed by pressing the maintenance  
end message key. Accordingly, it is possible for the  
image forming device management system of the present  
15 embodiment to manage an accurate maintenance service start  
time of each of the image forming devices 400.

#### 6.6 MAINTENANCE SERVICE END KEY CHECK PROCESS

As described above, during the service  
program mode, the maintenance service of the image forming  
20 device 400 is performed by the serviceman. When the  
maintenance service is complete, the maintenance end  
message key of the service program mode indication on the  
character display part 83 is pressed or turned ON by the  
serviceman. At this time, the image forming device 400  
25 automatically transmits a maintenance service end message

1 through the DCD 420 to the CSS 460. The maintenance  
service end message notifies the CSS 460 of the end of the  
maintenance service of the image forming device 400 by the  
serviceman.

5 In the present embodiment, only when the  
maintenance run flag is set to "1", the maintenance end  
message key of the service program mode indication is  
displayed on the character display part 83.

FIG. 73 shows a maintenance service end  
10 message process performed by the CPU 500 of the image  
forming device 400 in the present embodiment.

As shown in FIG. 73, the CPU 500 at step  
S731 determines whether the maintenance run flag is equal  
to "1". When the result at the step S731 is negative (or  
15 the maintenance run flag = 0), the CPU 500 at step S732  
eliminates the maintenance end message key from the  
character display part 83, regardless of the current  
condition of the service program mode indication displayed  
on the character display part 83. After the step S732 is  
20 performed, the CPU 500 ends the maintenance service end  
message process of FIG. 73. Hence, when the maintenance  
run flag is equal to "0", the automatic transmission of  
the maintenance service end message is inhibited.

When the result at the step S731 is  
25 affirmative (or the maintenance run flag = 1), the CPU 500

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1 at step S733 displays the maintenance end message key on  
the character display part 83, regardless of the current  
condition of the service program mode indication displayed  
on the character display part 83. After the step S733 is  
5 performed, the CPU 500 at step S734 determines whether the  
maintenance end message key is pressed or turned ON by the  
serviceman.

When the result at the step S734 is  
negative, the CPU 500 ends the maintenance service end  
10 message process of FIG. 73. On the other hand, when the  
result at the step S734 is affirmative, the CPU 500 at  
step S735 transmits the maintenance service end message  
through the DCD 420 to the CSS 460. After the step S735  
is performed, the CPU at step S736 resets the maintenance  
15 run flag to "0". After the step S736 is performed, the  
CPU 500 ends the maintenance service end message process  
of FIG. 73. Hence, it is possible for the image forming  
device management system of the present embodiment to  
manage an accurate maintenance service end time of each of  
20 the image forming devices 400.

Further, the present invention is not  
limited to the above-described embodiments, and variations  
and modifications may be made without departing from the  
scope of the present invention.

1     WHAT IS CLAIMED IS:

5

1. An image forming device management  
system including:

          a plurality of image forming devices;  
          a central service station for providing a  
10 maintenance service for the image forming devices; and  
          a communication control unit connected to  
each of the image forming devices by a signal line, the  
communication control unit connecting one of the image  
forming devices to the central service station via a  
15 communication network,

          wherein each of the image forming devices  
comprises message means for outputting a signal line  
separation message when the image forming device has no  
signal from the central service station or the  
20 communication control unit over a predetermined period.

25

2. The system according to claim 1,

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1 wherein each of the image forming devices comprises  
detection means for detecting that the image forming  
device has no signal from the communication control unit  
over the predetermined period, based on a response of the  
5 image forming device to a selecting of the communication  
control unit to the image forming device.

10

3. The system according to claim 1,  
wherein each of the image forming devices comprises  
detection means for detecting that the image forming  
device has no signal from the central service station over  
15 the predetermined period, based on a response of the image  
forming device to a selecting of the central service  
station to the image forming device.

20

4. The system according to claim 1,  
wherein each of the image forming devices comprises  
detection means for detecting that the image forming  
25 device has no signal from the communication control unit

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1 over the predetermined period, based on a response of the  
image forming device to a polling of the communication  
control unit to the image forming device.

5

5. The system according to claim 1,  
wherein each of the image forming devices includes a  
10 communication interface unit having a terminal connected  
to the communication control unit, and each of the image  
forming devices comprises detection means for detecting  
that the image forming device has no signal from the  
communication control unit over the predetermined period,  
15 based on a detected voltage of the terminal of the  
communication interface unit.

20

6. The system according to claim 1,  
wherein each of the image forming devices includes a  
connection detecting circuit having an input connected to  
the communication control unit, and each of the image  
25 forming devices comprises detection means for detecting

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1     that the image forming device has no signal from the  
communication control unit over the predetermined period,  
based on an output of the connection detecting circuit.

5

7. The system according to claim 1,  
wherein the signal line separation message output by the  
10     message means indicates a separation of the signal line  
between the image forming device and the communication  
control unit.

15

8. An image forming device management  
system including:

20     a plurality of image forming devices;  
a central service station for providing a  
maintenance service for the image forming devices; and  
a communication control unit connected to  
each of the image forming devices, the communication  
control unit connecting one of the image forming devices  
25     to the central service station via a communication

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1 network,

wherein each of the image forming devices  
comprises:

jam detection means for detecting a jam of  
5 the image forming device;

image formation detection means for  
detecting a normal end of image formation by the image  
forming device;

remote message means for transmitting a  
10 first remote message through the communication control  
unit to the central service station, the first remote  
message indicating that the jam of the image forming  
device is continuously detected for a predetermined number  
of copy sheets before the normal end of image formation by  
15 the image forming device is detected; and

remote message inhibition means for  
inhibiting the remote message means from transmitting a  
subsequent remote message after the transmission of the  
first remote message until the normal end of image  
20 formation by the image forming device is detected.

25

9. An image forming device management

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1 system including:

a plurality of image forming devices;

a central service station for providing a  
maintenance service for the image forming devices; and

5 a communication control unit connected to  
each of the image forming devices, the communication  
control unit connecting one of the image forming devices  
to the central service station via a communication  
network,

10 wherein each of the image forming devices  
comprises:

jam detection means for detecting a jam of  
the image forming device;

image formation detection means for  
15 detecting a normal end of image formation by the image  
forming device;

remote message means for transmitting a  
remote message through the communication control unit to  
the central service station, the remote message indicating  
20 that the jam of the image forming device is continuously  
detected for a predetermined number of copy sheets before  
the normal end of image formation by the image forming  
device is detected;

a time counter for outputting a time count  
25 indicating a period of the jam of the image forming

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1 device; and

remote message inhibition means for  
inhibiting the remote message means from transmitting the  
remote message when the time count output by the time  
5 counter exceeds a predetermined value.

10 10. The system according to claim 9,  
wherein each of the image forming devices further  
comprises:

setting means for setting the remote  
message inhibition means in one of an ON state and an OFF  
15 state; and

time count resetting means for resetting  
the time counter to zero when the remote message  
inhibition means is set from the OFF state into the ON  
state by the setting means.

20

11. An image forming device management  
25 system including:

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1 a plurality of image forming devices;  
a central service station for providing a  
maintenance service for the image forming devices; and  
a communication device for connecting one  
5 of the image forming devices to the central service  
station via a communication network,  
wherein each of the image forming devices  
comprises:

remote message means for transmitting a  
10 remote message through the communication device to the  
central service station when a maintenance service of the  
image forming device is initiated or terminated by a  
serviceman; and

a non-volatile memory for retaining a  
15 content of a serviceman visit flag, the serviceman visit  
flag indicating whether the maintenance service of the  
image forming device is initiated or terminated by the  
serviceman.

20

12. The system according to claim 11,  
wherein each of the image forming devices further  
25 comprises:

1 means for transmitting a serviceman request  
through the communication device to the central service  
station when the image forming device requires a  
serviceman service; and  
5 request inhibition means for inhibiting  
said means from transmitting the serviceman request when  
the serviceman visit flag retained by the memory indicates  
that the maintenance service of the image forming device  
is initiated.

10

13. The system according to claim 11,  
15 wherein each of the image forming devices further  
comprises:

statistical data storage means for storing  
statistical data including a continuous jam count output  
by a continuous jam counter, a long-period jam time count  
20 output by a long-period jam counter, and a door-open time  
count output by a door-open time counter; and

means for initializing the statistical data  
of the statistical data storage means when the serviceman  
visit flag retained by the memory indicates that the  
25 maintenance service of the image forming device is

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1 terminated.

5

14. The system according to claim 11,  
wherein each of the image forming devices further  
comprises means for controlling the remote message means  
to transmit a remote message indicating an end of the  
10 maintenance service, to the central service station when  
the remote message means does not transmit the remote  
message over a predetermined period after a start of the  
maintenance service of the image forming device by the  
serviceman.

15

15. An image forming device management  
20 system including:

a plurality of image forming devices;  
a central service station for providing a  
maintenance service for the image forming devices; and  
a communication device for connecting one  
25 of the image forming devices to the central service

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1 station via a communication network,

wherein each of the image forming devices  
comprises:

receiving means for receiving a non-  
5 resettable copy count and a remote message cycle, both  
transmitted to the image forming device by the central  
service station through the communication device, the copy  
count indicating a predetermined number of copy sheets  
with respect to a contract for use of the image forming  
10 device, the remote message cycle indicating a frequency at  
which the image forming device transmits a remote message  
to the central service station;

first storage means for storing the copy  
count and the remote message cycle received by the  
15 receiving means;

second storage means for storing a current  
copy count that is incremented every time an image  
formation of one copy sheet is performed by the image  
forming device;

20 control means for setting the image forming  
device in a remote message enable state when a difference  
between the current copy count and the received copy count  
reaches an integral multiple of the remote message cycle;  
and

25 remote message means for transmitting the

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1 remote message through the communication device to the  
central service station after the image forming device is  
set in the remote message enable state by the control  
means.

5

16. The system according to claim 15,  
10 wherein the remote message transmitted to the central  
service station by the remote message means includes a  
remote message purpose and the current copy count.

15

17. The system according to claim 15,  
wherein the copy count received by the receiving means  
indicates a predetermined number of copy sheets at a start  
20 of a block billing contract for use of the image forming  
device.

25

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1           18. The system according to claim 15,  
wherein the copy count received by the receiving means  
indicates a predetermined number of copy sheets at an end  
of a block billing contract for use of the image forming  
5 device.

10           19. The system according to claim 15,  
wherein each of the image forming devices includes an  
operational display device, at least one of a copy count  
at a start of a block billing contract for use of the  
image forming device, a copy count at an end of the block  
15 billing contract, and the difference between the current  
copy count and the received copy count being displayed on  
the operational display device.

20

          20. The system according to claim 15,  
wherein each of the image forming devices includes an  
operational display device, the difference between the  
25 current copy count and the received copy count being

1 displayed on the operational display device.

5

21. An image forming device management system including:

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a plurality of image forming devices, each of the image forming devices having operating parameters stored in a memory of the image forming device, and absolute addresses of the memory where the respective operating parameters are stored being predetermined according to a kind of each operating parameter;

a central service station for reading information from or writing information to the operating parameters of one of the image forming devices by transmitting an access request to said one of the image forming devices; and

a communication device for connecting one of the image forming devices to the central service station via a communication network,

wherein the central service station comprises parameter code transmitting means for transmitting a parameter code, indicating a kind of a particular one of the operating parameters, through the

1 communication device to one of the image forming devices  
when transmitting an access request to said one of the  
image forming devices, and

wherein each of the image forming devices  
5 comprises:

address determination means responsive to  
the access request for determining an absolute address of  
the memory of the image forming device in accordance with  
the parameter code transmitted by said code transmitting  
10 means; and

access request processing means for  
accessing the particular one of the operating parameters  
at the absolute address of the memory determined by the  
address determination means.

15

22. The system according to claim 21,  
20 wherein the image forming devices are of different models,  
and share a common parameter code indicating an identical  
kind for the operating parameters of the individual image  
forming devices regardless of the model of each image  
forming device.

25

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1                   23. An image forming device management  
system including:

                  a plurality of image forming devices;  
                  a central service station for providing a  
5   maintenance service for the image forming devices; and  
                  a communication device for connecting one  
of the image forming devices to the central service  
station via a communication network,

                  wherein each of the image forming devices  
10 comprises:

                  first request means for outputting a mode  
shift request to the image forming device, the mode shift  
request initiating a shift of the image forming device to  
a maintenance mode;

15                   maintenance mode start means for setting  
the image forming device in the maintenance mode in  
response to the mode shift request output by the first  
request means;

                  first remote message means for transmitting  
20 a first remote message through the communication device to  
the central service station in response to the mode shift  
request output by the first request means, the first  
remote message indicating a start of a maintenance service  
of the image forming device;

25                   second request means for outputting a

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1 maintenance end request to the image forming device, the  
maintenance end request terminating the maintenance mode  
of the image forming device; and

second remote message means for  
5 transmitting a second remote message through the  
communication device to the central service station in  
response to the maintenance end request output by the  
second request means, the second remote message indicating  
an end of the maintenance service of the image forming  
10 device.

15 24. The system according to claim 23,  
wherein each of the image forming devices further  
comprises remote message inhibition means for inhibiting  
the first remote message means from transmitting a remote  
message through the communication device to the central  
20 service station when a mode shift request is output again  
by the first request means after the first remote message  
is transmitted by the first remote message means and  
before the second remote message is transmitted by the  
second remote message means.

25

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1                   25. An image forming device management  
system including:

                  a plurality of image forming devices;  
                  a central service station for providing a  
5   maintenance service for the image forming devices; and  
                  a communication device for connecting one  
of the image forming devices to the central service  
station via a communication network,

                  wherein each of the image forming devices  
10 comprises:

                  first request means for outputting a mode  
shift request to the image forming device,

                  first display means for displaying a first  
mode shift key in response to the mode shift request  
15 output by the first request means,

                  second request means for initiating a shift  
of the image forming device to a maintenance mode when the  
first mode shift key displayed by the first display means  
is turned ON;

20                   maintenance mode start means for setting  
the image forming device in the maintenance mode when the  
shift of the image forming device to the maintenance mode  
is initiated by the second request means;

                  first remote message means for transmitting  
25 a first remote message through the communication device to

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1 the central service station when the shift of the image  
forming device to the maintenance mode is initiated by the  
second request means, the first remote message indicating  
a start of a maintenance service of the image forming  
5 device;

third request means for outputting a  
maintenance end request to the image forming device, the  
maintenance end request terminating the maintenance mode  
of the image forming device; and

10 second remote message means for  
transmitting a second remote message through the  
communication device to the central service station in  
response to the maintenance end request output by the  
second request means, the second remote message indicating  
15 an end of the maintenance service of the image forming  
device.

20

26. The system according to claim 25,  
wherein each of the image forming devices further  
comprises display inhibition means for inhibiting the  
first display means from displaying the first mode shift  
25 key when a mode shift request is output again by the first

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1 request means after the first remote message is  
transmitted by the first remote message means and before  
the second remote message is transmitted by the second  
remote message means.

5

27. The system according to claim 25,  
10 wherein each of the image forming devices further  
comprises second display means for displaying a second  
mode shift key after the first remote message is  
transmitted by the first remote message means, the third  
request means outputting the maintenance end request to  
15 the image forming device when the second mode shift key  
displayed by the second display means is turned ON.

20

28. The system according to claim 23,  
wherein the communication device is a data communication  
device connected to each of the image forming devices, the  
data communication device connecting one of the image  
25 forming devices to the central service station via a

1. communication network.

5

29. The system according to claim 23,  
wherein the communication device comprises a communication  
control unit connected to each of the image forming  
devices, the communication control unit connecting one of  
10 the image forming devices to the central service station  
via a communication network.

15

20

25

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1     ABSTRACT OF THE DISCLOSURE

          An image forming device management system  
includes a plurality of image forming devices, a central  
service station which provides a maintenance service for  
5     the image forming devices, and a communication control  
unit which is connected to each of the image forming  
devices by a signal line, the communication control unit  
connecting one of the image forming devices to the central  
service station via a communication network. In the  
10    system, each of the image forming devices includes a  
message unit which outputs a signal line separation  
message when the image forming device has no signal from  
the central service station or the communication control  
unit over a predetermined period.

15

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FIG.1

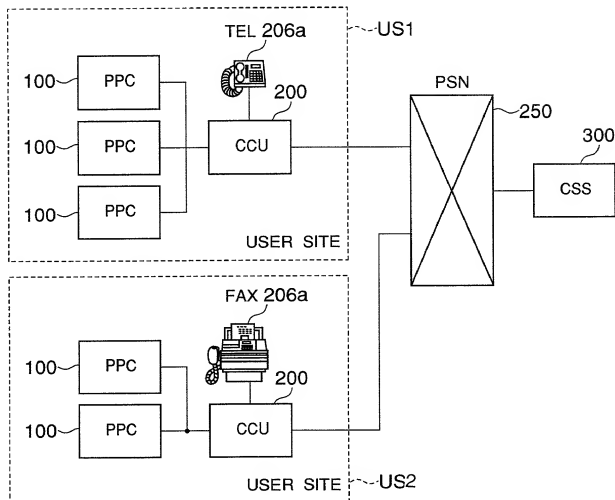
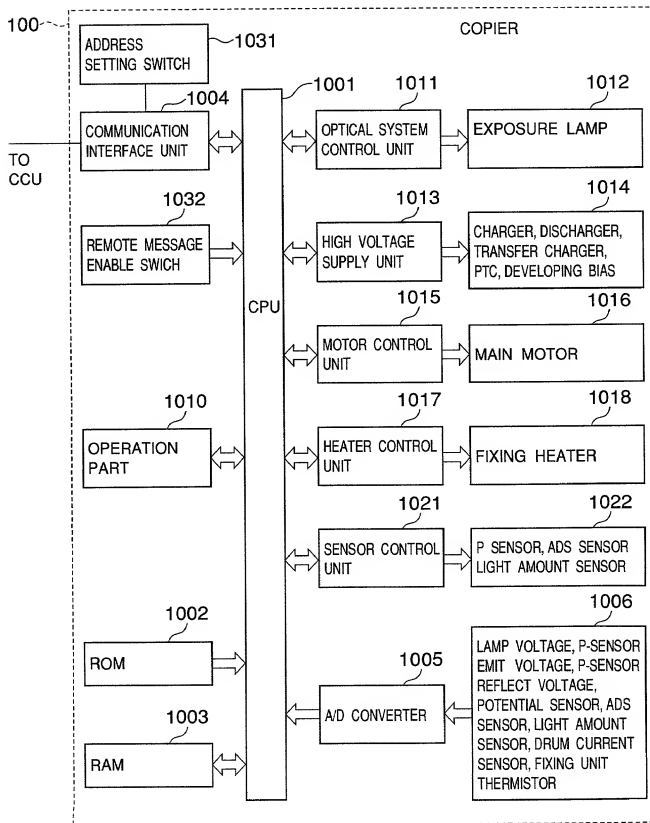




FIG.2



866111-40956160

FIG. 3

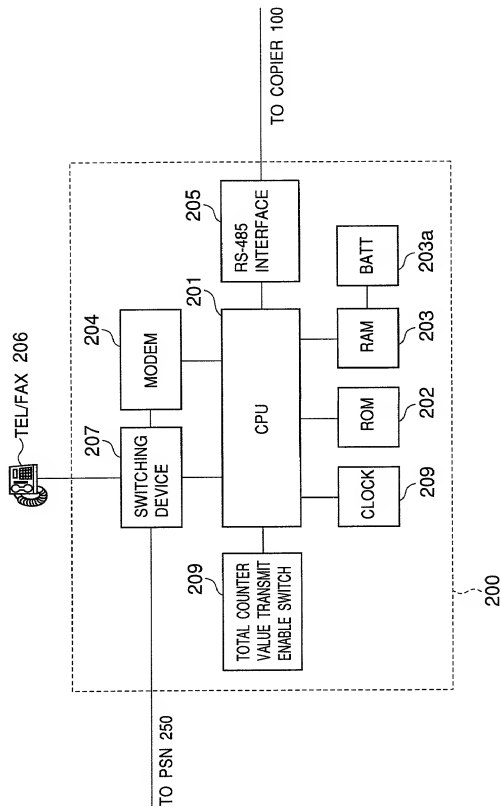


FIG.4

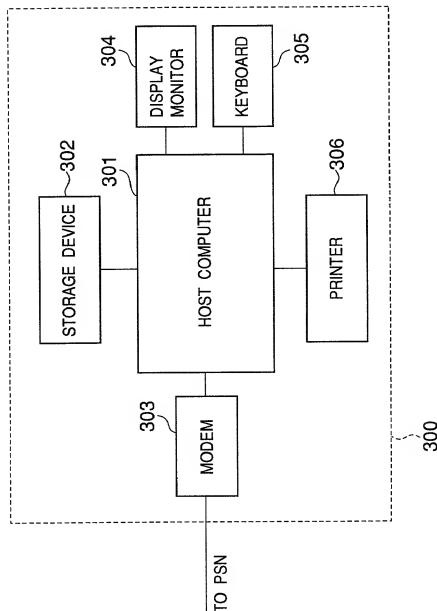


FIG.5

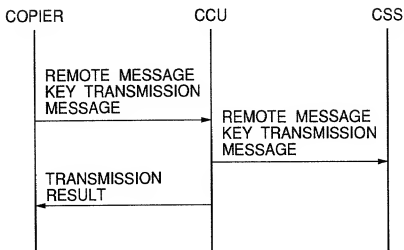


FIG.6

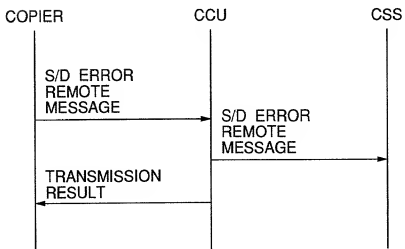
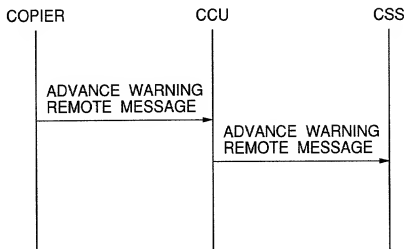


FIG.7



09195604-111998

FIG.8A

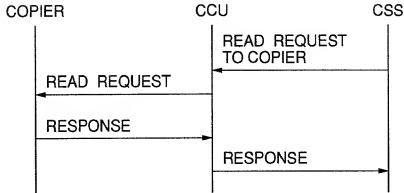


FIG.8B

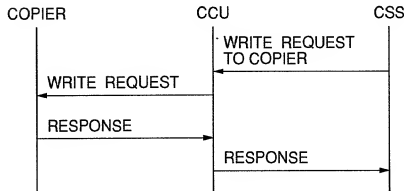


FIG.8C

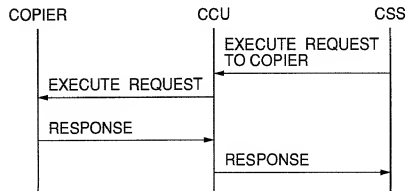


FIG.9A

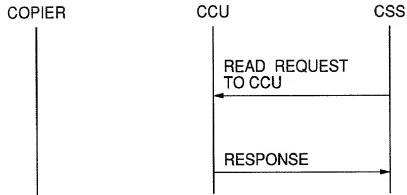


FIG.9B

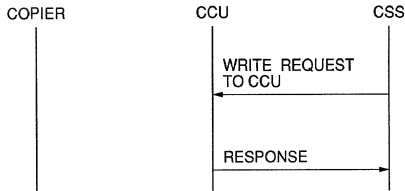
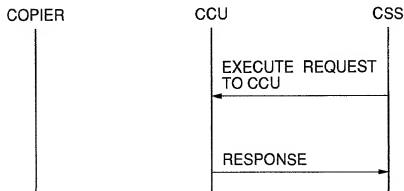
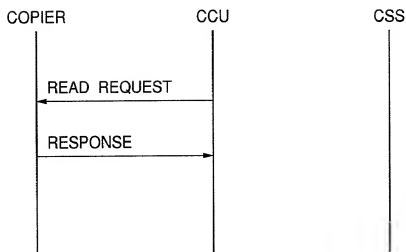


FIG.9C



866777-40956160

FIG.10



866777-40556160



FIG.11

PARAMETERS		DATA LENGTH
ADDRESS-1 COPIER	MODEL NO.	6
	SERIAL NO.	10
	CHECK SUM.	4
ADDRESS-2 COPIER	MODEL NO.	6
	SERIAL NO.	10
	CHECK SUM.	4
ADDRESS-3 COPIER	MODEL NO.	6
	SERIAL NO.	10
	CHECK SUM.	4
ADDRESS-4 COPIER	MODEL NO.	6
	SERIAL NO.	10
	CHECK SUM.	4
ADDRESS-5 COPIER	MODEL NO.	6
	SERIAL NO.	10
	CHECK SUM.	4
REMOTE MESSAGE TRANSMISSION BY REMOTE MESSAGE KEY	DESTINATION TEL NO.	32
	NO. OF REDIALS	2
	REDIAL PERIOD	3
	CONDITIONS OF DATA TRANSMISSION TO	NO. OF JAMS NO. OF S/D ERRORS
	CSS IN REMOTE	NO. OF COPIES
	MESSAGE TRANSMISSION	STATE OF COPIER
	CHECK SUM	4
	DESTINATION TEL NO.	32
REMOTE MESSAGE TRANSMISSION BY SELF-DIAGNOSTIC ERROR	NO. OF REDIALS	2
	REDIAL PERIOD	3
	CONDITIONS OF DATA TRANSMISSION TO	NO. OF JAMS NO. OF S/D ERRORS
	CSS IN REMOTE	NO. OF COPIES
	MESSAGE TRANSMISSION	STATE OF COPIER
	CHECK SUM	4
	DESTINATION TEL NO.	32
	NO. OF REDIALS	2
REMOTE MESSAGE TRANSMISSION BY ADVANCE WARNING	REDIAL PERIOD	3
	CONDITIONS OF DATA TRANSMISSION TO	NO. OF JAMS NO. OF S/D ERRORS
	CSS IN REMOTE	NO. OF COPIES
	MESSAGE TRANSMISSION	STATE OF COPIER
	TIME OF NOTIFICATION	4
	CHECK SUM	4
	TIME OF TOTAL COUNTER VALUE COLLECTION	4
	DESTINATION TEL NO.	32
TOTAL COUNTER VALUE TRANSMIT PROCESS	DATE AND TIME OF TRANSMISSION	6
	CHECK SUM	4
SETTING OF TELEPHONE	DIAL MODE SETTING(PULSE OR TONE)	1
	DIAL PULSE PERIOD	1
	CHECK SUM	4

866711-40956160

FIG.12A

MESSAGE FROM COPIER 100 TO CCU 200

MESSAGE CODE	NO. OF JAMS			NO. OF SID ERRORS			NO. OF COPIES			STATE OF COPIER					
	TOTAL	PART A	PART B	...	TOTAL	TYPE A	TYPE B	...	TOTAL	SIZE A	SIZE B	...	STATE A	STATE B	STATE C

FIG.12B

MESSAGE FROM CCU 200 TO CSS 300

MODEL NO.	SERIAL NO.	MESSAGE CODE	NO. OF SID ERRORS			STATE OF COPIER			TIME OF OCCURRENCE	
			TOTAL	TYPE A	TYPE B	...	STATE A	STATE B	STATE C	...

FIG.12C

RESPONSE FROM CCU 200 TO COPIER 100

RESPONSE CODE	CONTENTS OF RESPONSE
------------------	-------------------------

FIG.13A

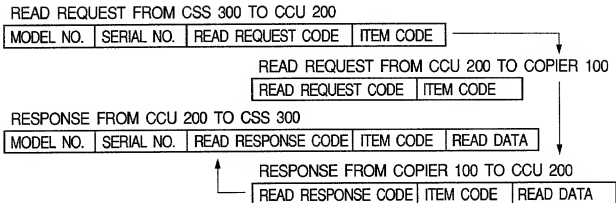


FIG.13B

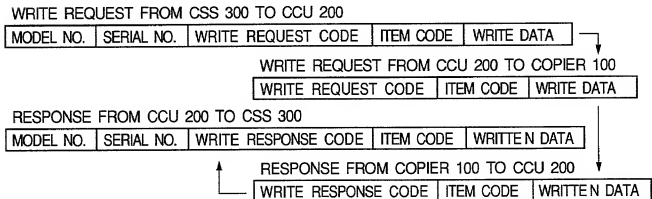
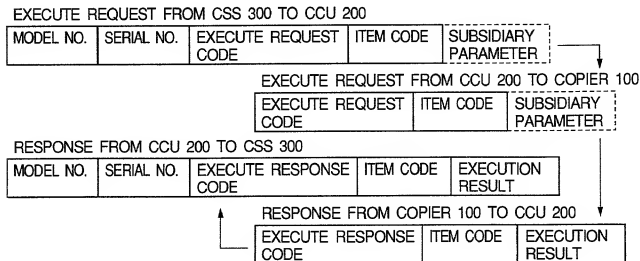


FIG.13C



0095304.11160

## FIG.14A

READ REQUEST FROM CSS 300 TO CCU 200

CCU DEVICE CODE	READ REQUEST CODE	ITEM CODE
-----------------	-------------------	-----------

RESPONSE FROM CCU 200 TO CSS 300

CCU DEVICE CODE	READ RESPONSE CODE	ITEM CODE	READ DATA
-----------------	--------------------	-----------	-----------

## FIG.14B

WRITE REQUEST FROM CSS 300 TO CCU 200

CCU DEVICE CODE	WRITE REQUEST CODE	ITEM CODE	WRITE DATA
-----------------	--------------------	-----------	------------

RESPONSE FROM CCU 200 TO CSS 300

CCU DEVICE CODE	WRITE RESPONSE CODE	ITEM CODE	WRITTEN DATA
-----------------	---------------------	-----------	--------------

## FIG.14C

EXECUTE REQUEST FROM CSS 300 TO CCU 200

CCU DEVICE CODE	EXECUTE REQUEST CODE	ITEM CODE	SUBSIDIARY PARAMETER
-----------------	----------------------	-----------	----------------------

RESPONSE FROM CCU 200 TO CSS 300

CCU DEVICE CODE	EXECUTE RESPONSE CODE	ITEM CODE	EXECUTION RESULT
-----------------	-----------------------	-----------	------------------

0019504.11999

## FIG.15A

READ REQUEST FROM CCU 200 TO COPIER 100

READ REQUEST CODE	ITEM CODE
-------------------	-----------

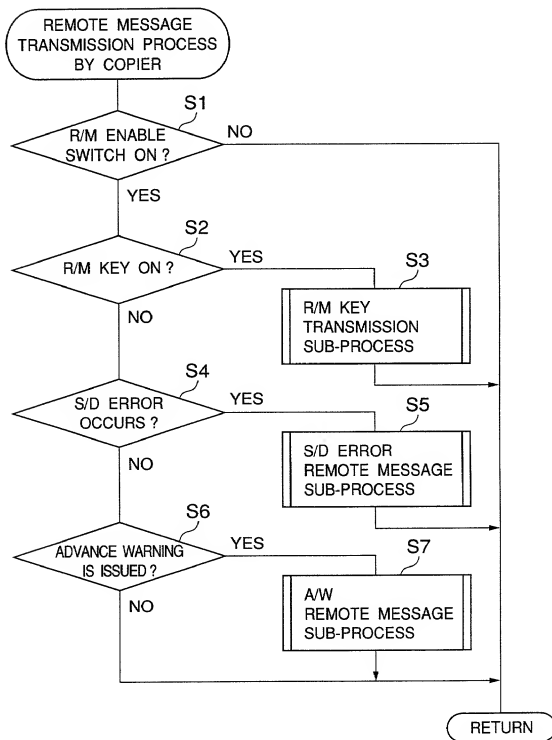
## FIG.15B

RESPONSE FROM COPIER 100 TO CCU 200

READ RESPONSE CODE	ITEM CODE	READ DATA
--------------------	-----------	-----------

00195604-11998  
86611-40556160

FIG.16



09195604.11998

FIG.17

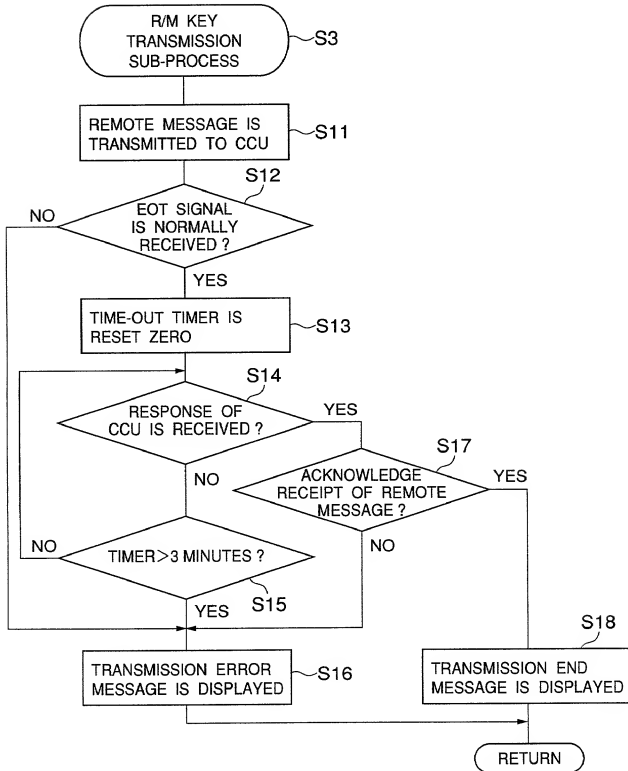


FIG.18

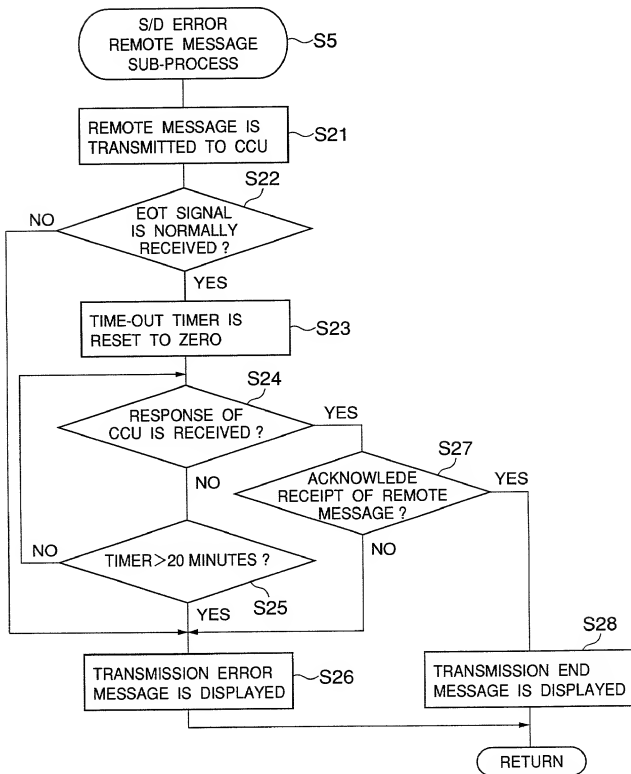
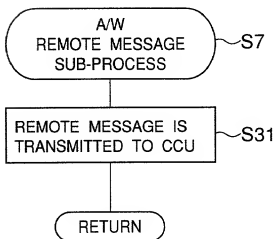


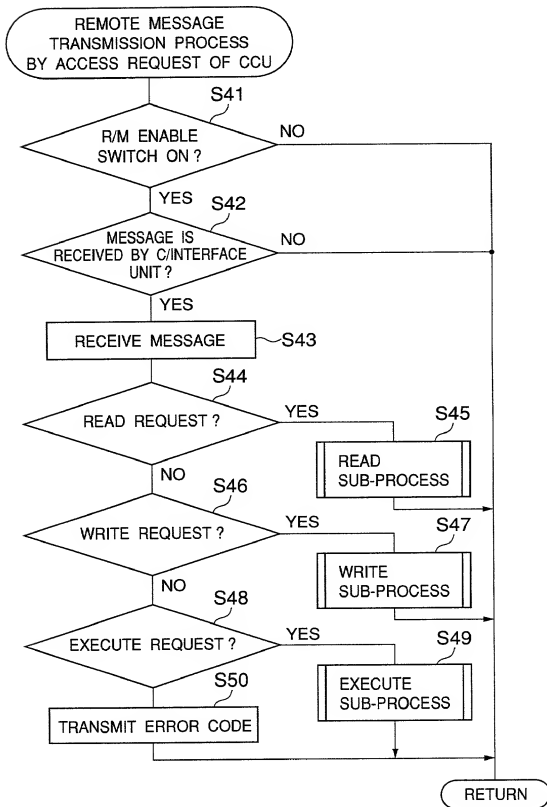


FIG.19



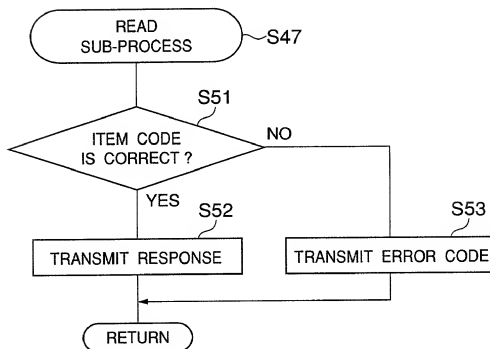
00195604.111998

FIG.20



866TTF-40956160

FIG.21



0915604-110000

FIG.22

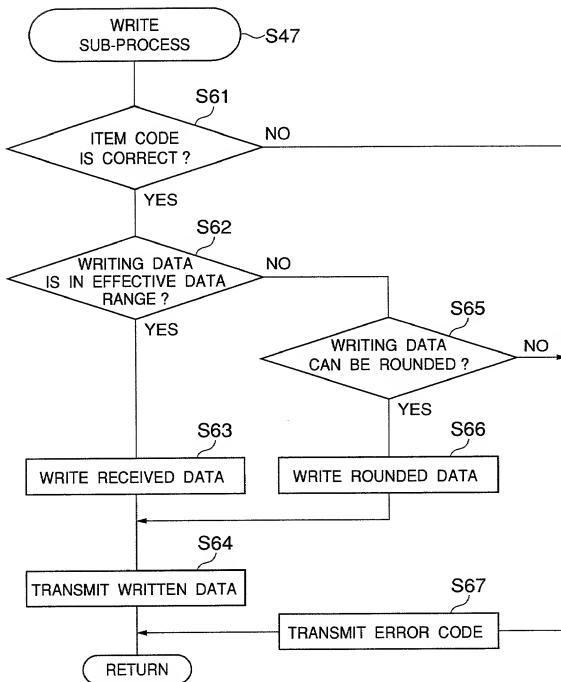
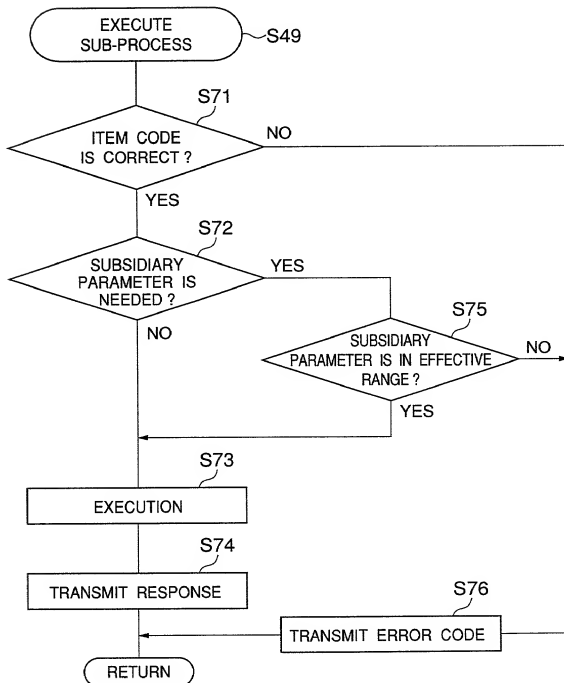
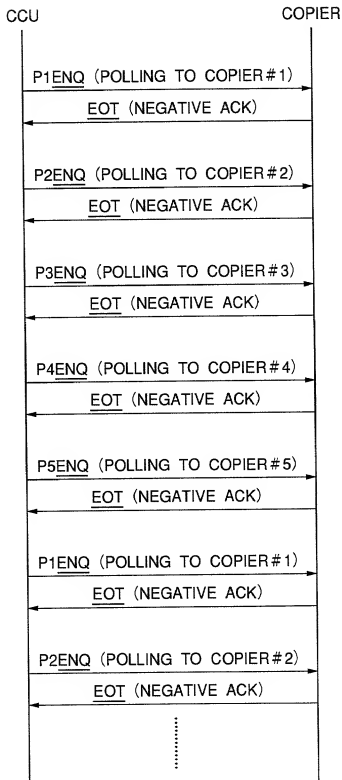


FIG.23



00195604.111998

FIG.24



0016504 111998  
866111 40956160

FIG.25

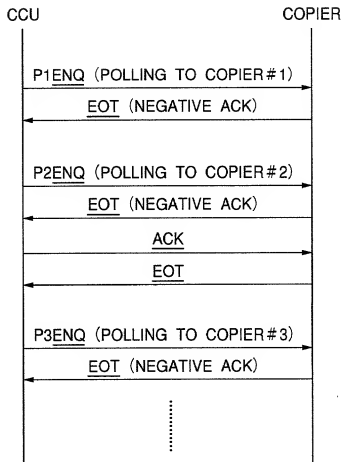
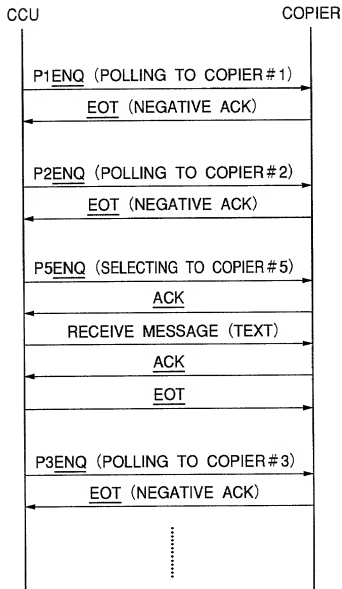


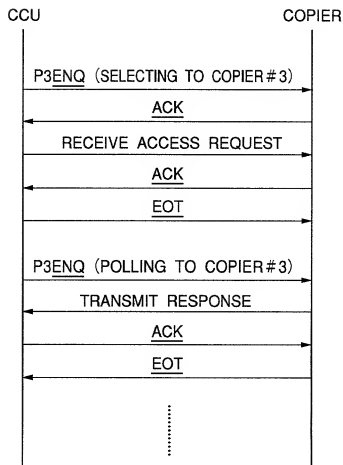
FIG.26



00195604-111988

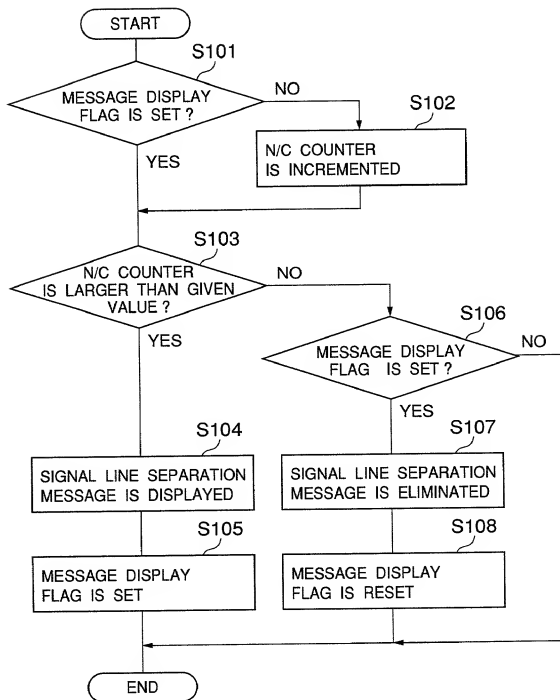


FIG.27



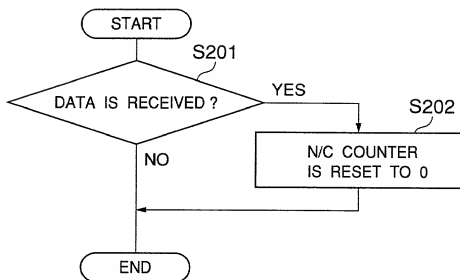
09195604-111998

FIG.28



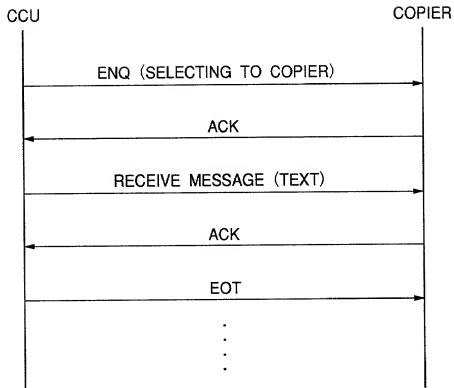
09195604.111998

FIG.29



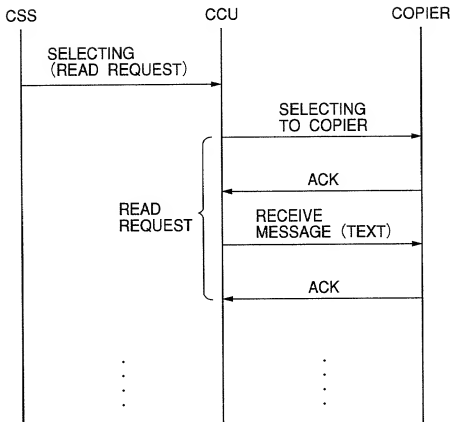
09195604-11199  
86677-40956160

FIG.30



866TT-40956160

FIG.31



09195604.111998

FIG.32

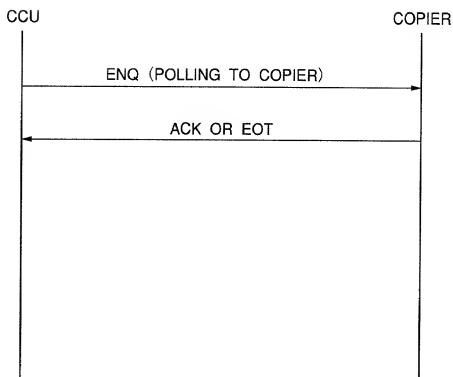


FIG.33

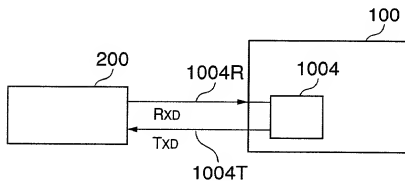


FIG.34

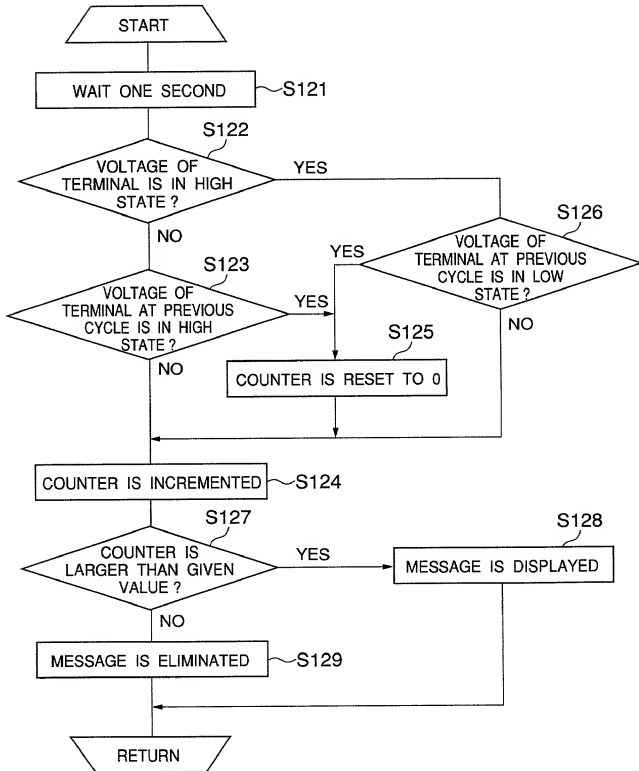


FIG.35A

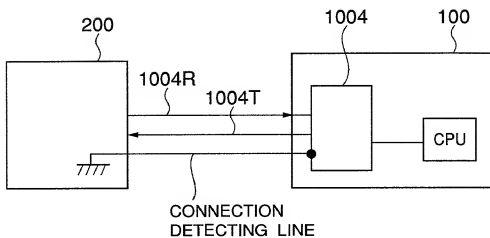
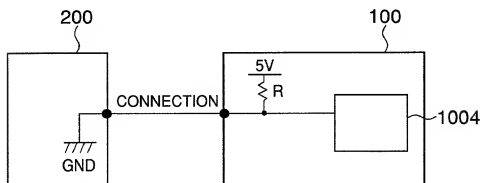


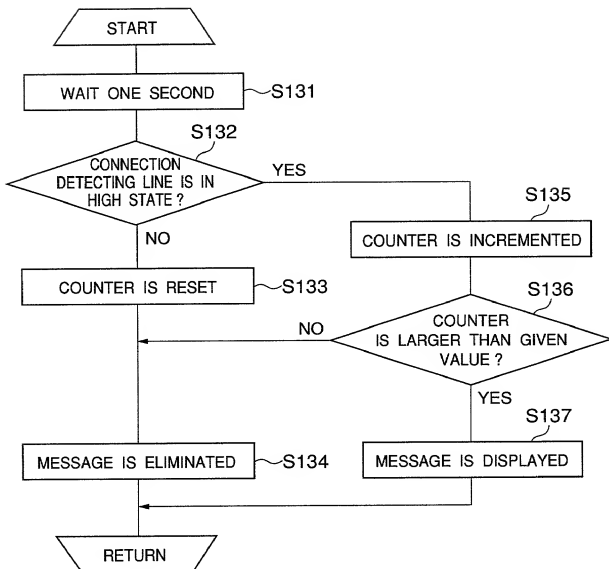
FIG.35B



00195604-111998



FIG.36



09195604-111998

FIG.37

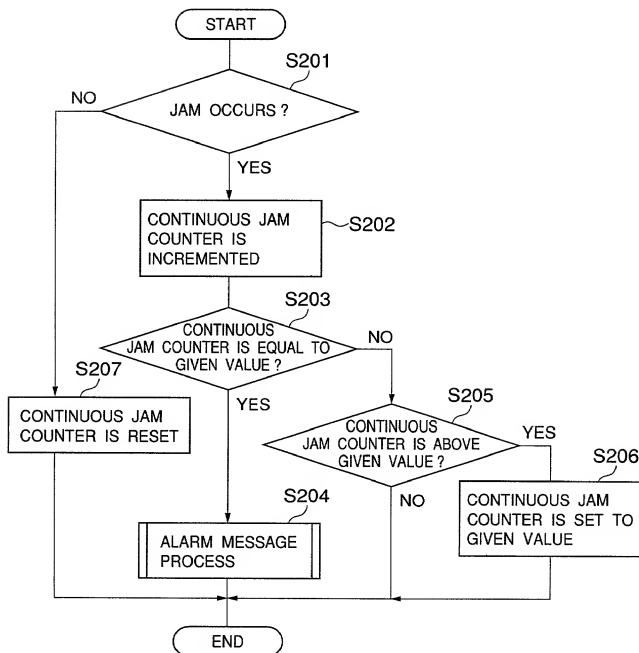
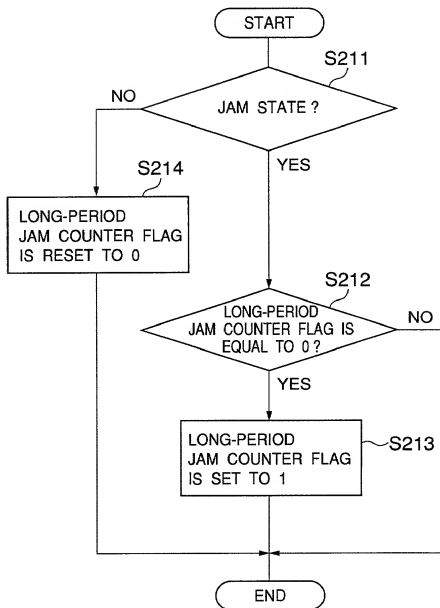


FIG.38



00195604 111998

FIG.39

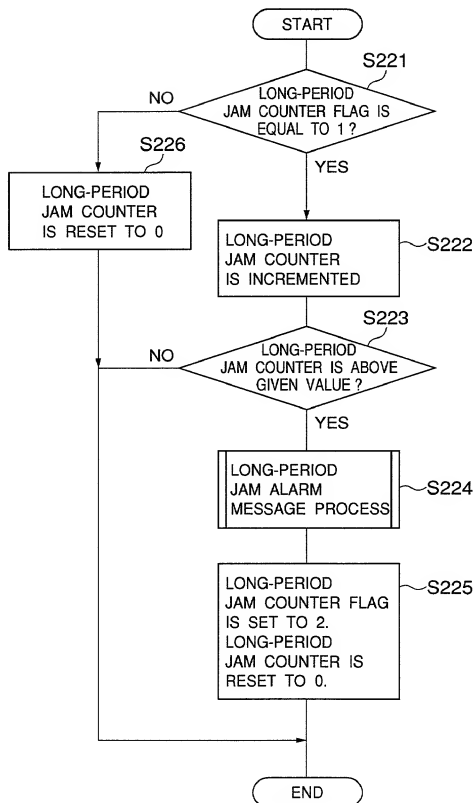


FIG.40

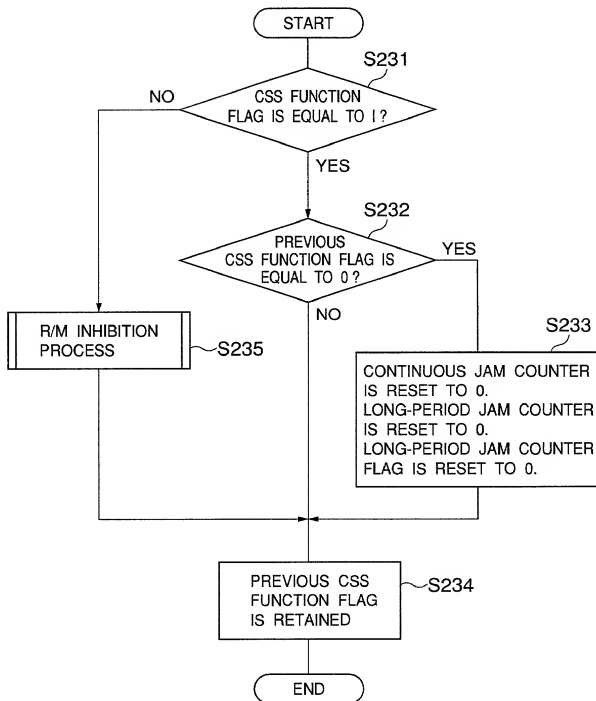


FIG.41

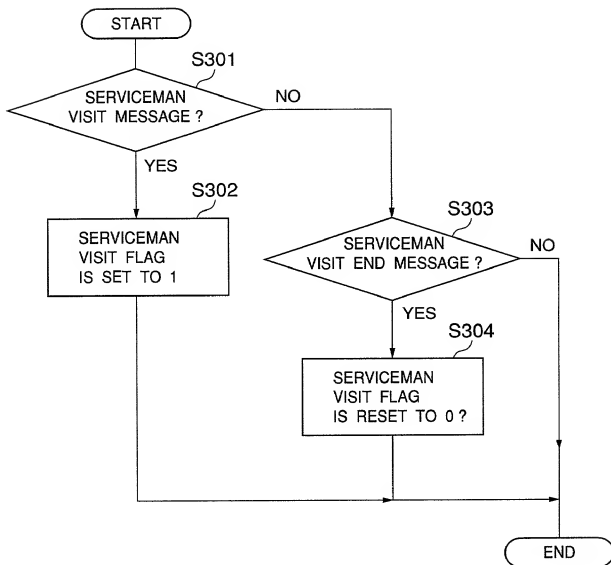
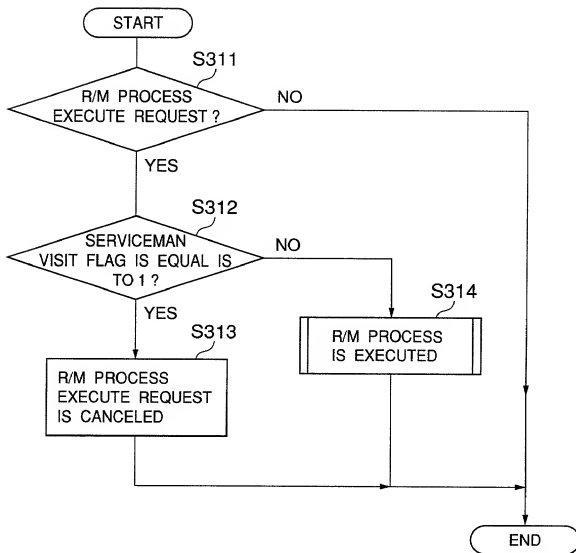
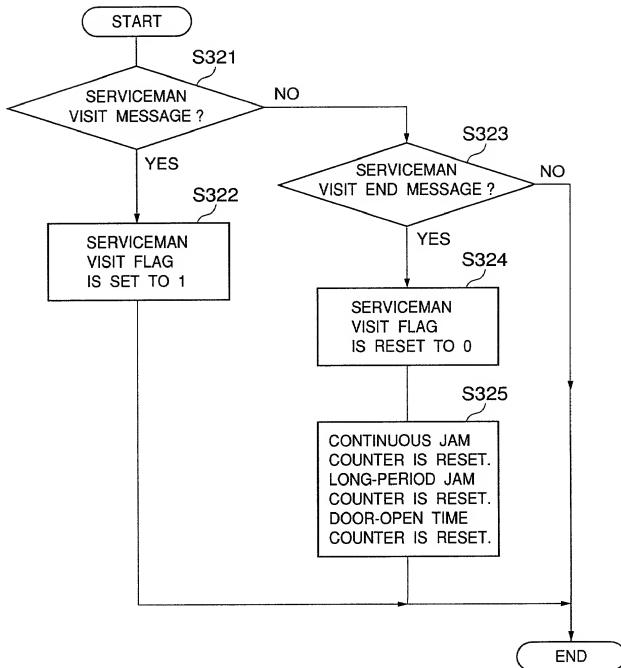


FIG.42



00155604-11199

FIG.43



86611-40956160



FIG. 44

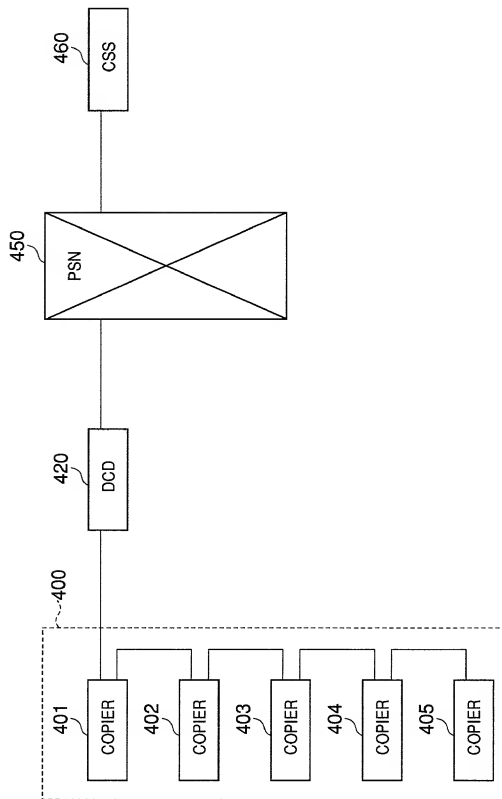


FIG. 45

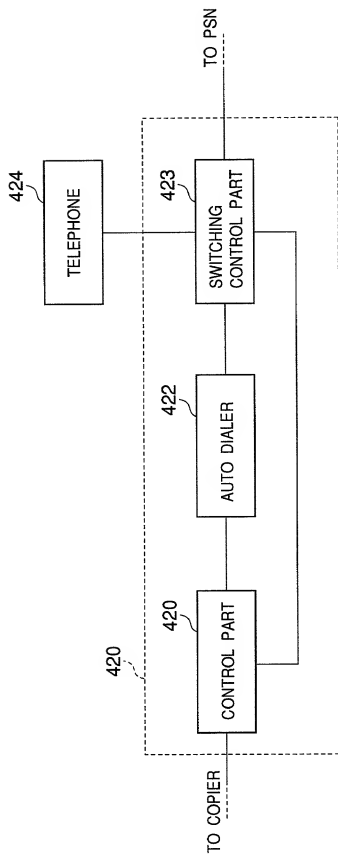
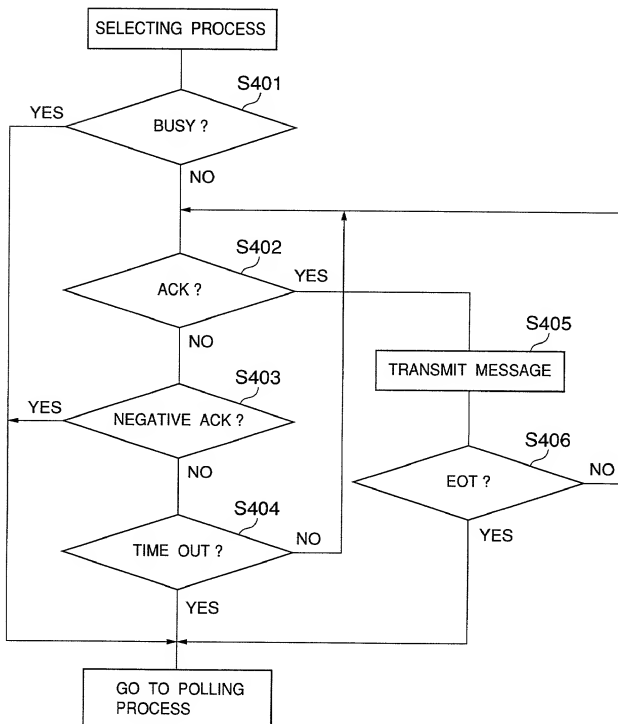
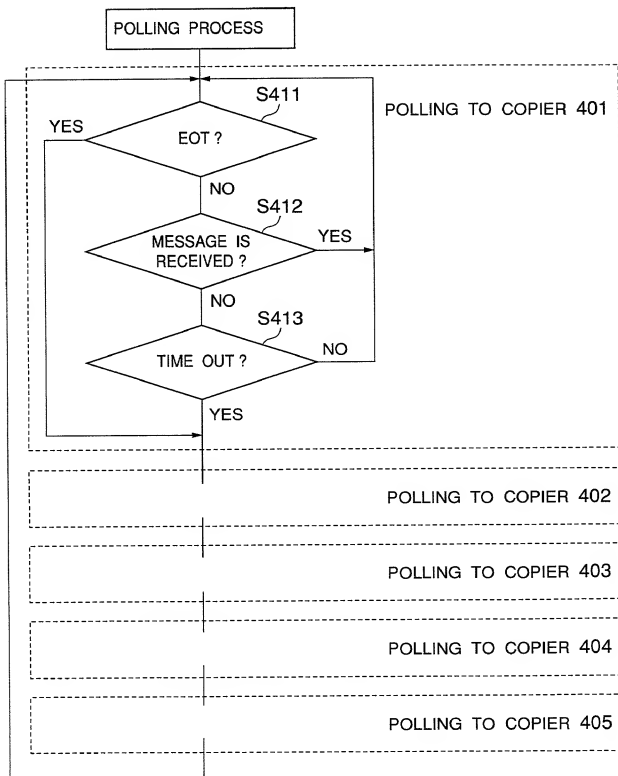


FIG.46



00165604-111998

FIG.47



09135604.111690

FIG. 48

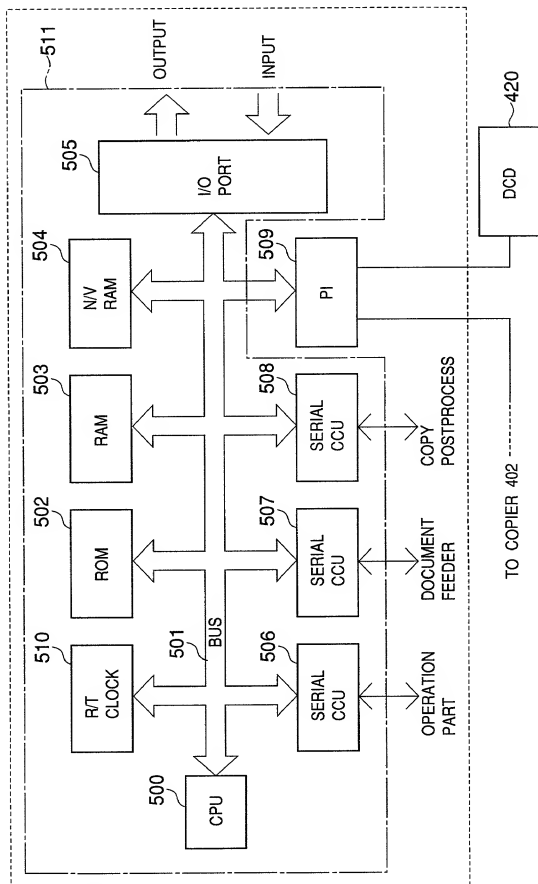


FIG. 49

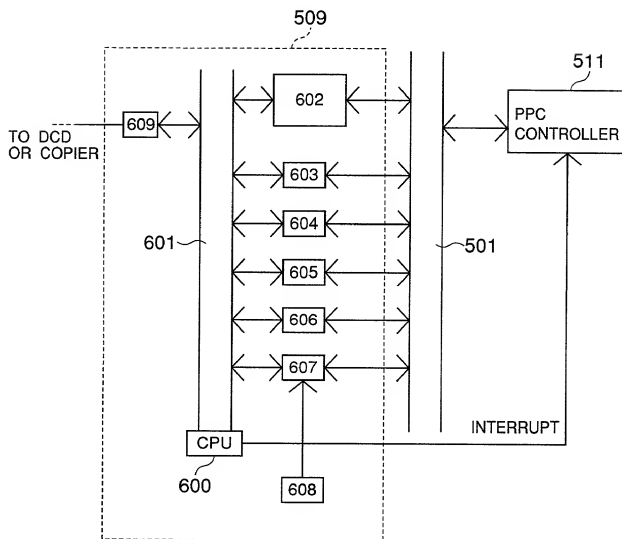
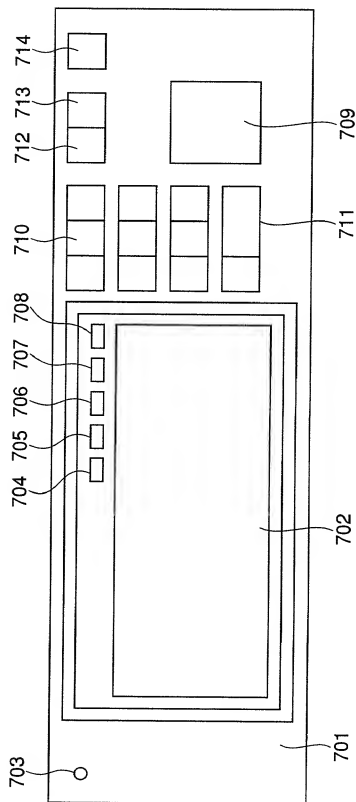


FIG. 50



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FIG.51

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SORTER	P/O	DUPLEX	SIZING		COPY POSSIBLE	1
			<div><div></div><div>A3 → B4 A4 → B5 B4 → A5 B5 → A5</div></div>	<div><div>93%</div><div>87%</div><div>82%</div><div>71%</div></div>		
SORT	BACK	D→D	VS		A 3	ASS
			ZOOM		A 4	
			SDS		A 4	
STACK	FRONT	D→S	<div><div></div><div>R/D</div></div>	<div><div></div><div>E/L</div></div>	LIGHT	DEEP
					ADS	



FIG. 52

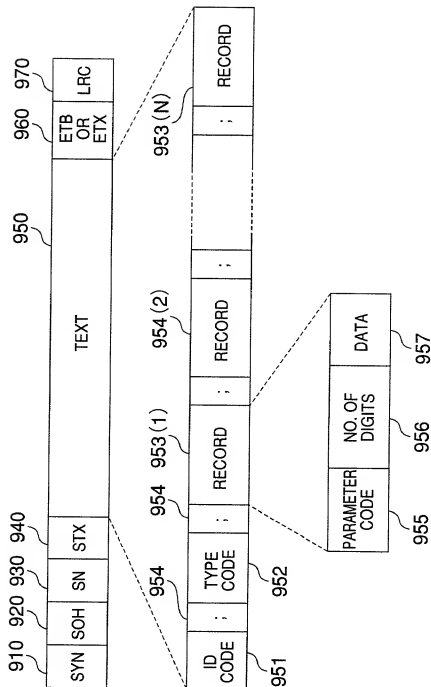


FIG.53

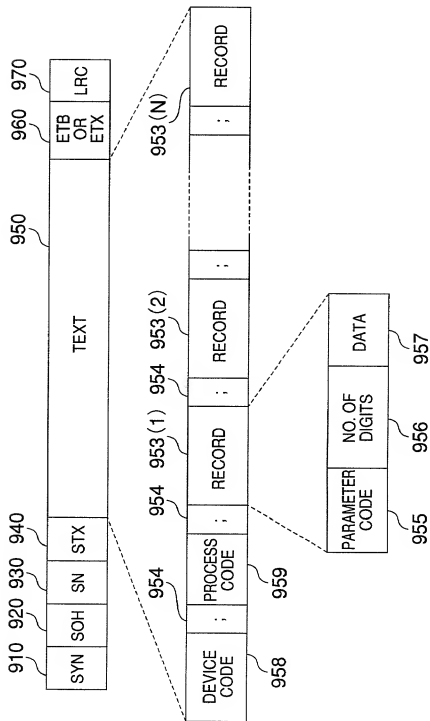


FIG. 54

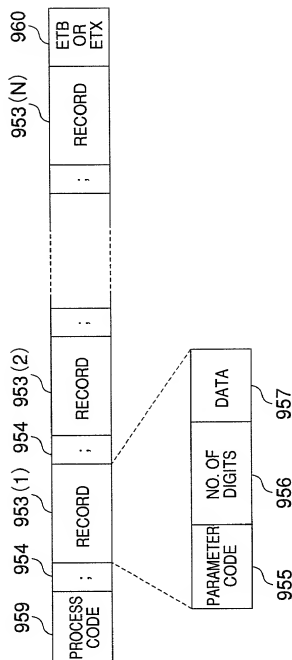


FIG.55

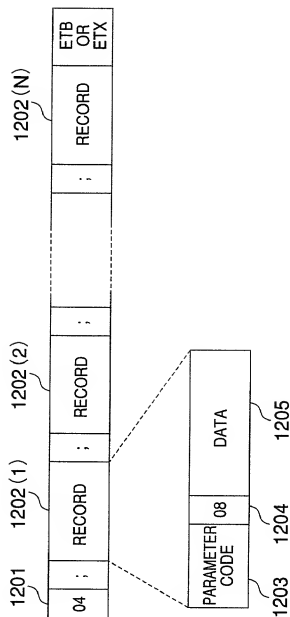


FIG.56

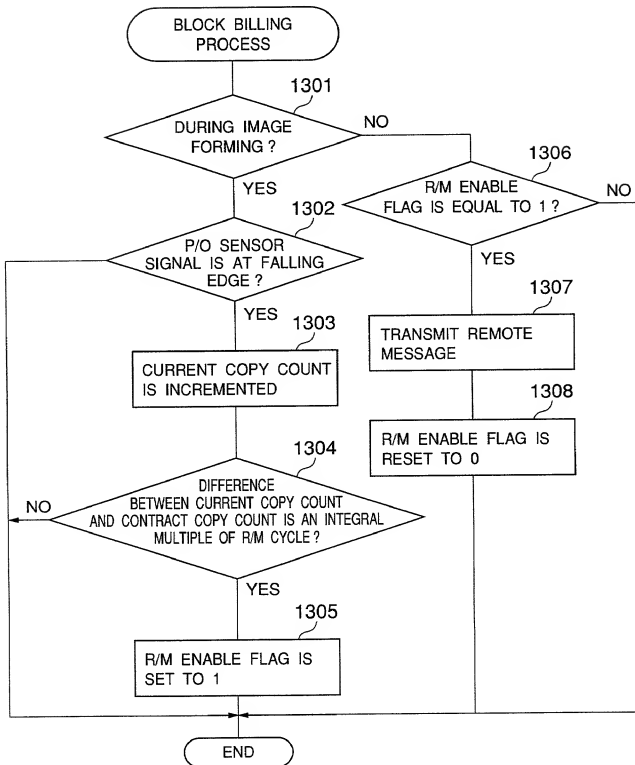


FIG. 57

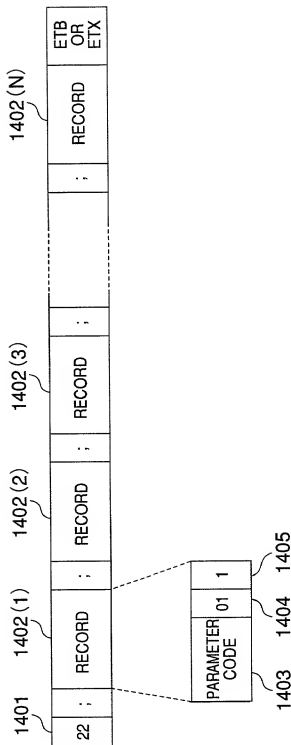


FIG. 58

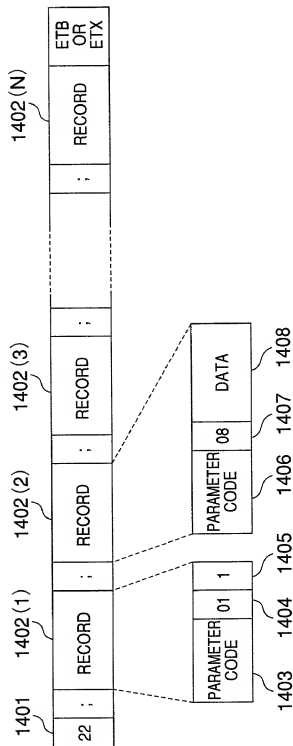


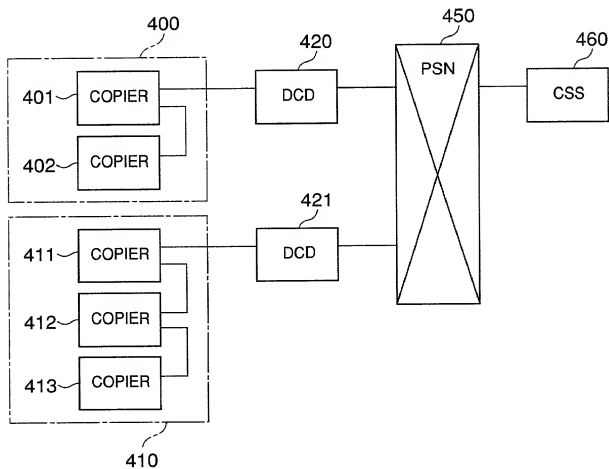
FIG.59

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CURRENT COPY COUNT	1 0 0 1 2 0 -----	BLOCK BILLING	USER TOOL	5
CONTRACT COPY COUNT	1 2 5 0 0 0 -----		PREVIOUS	END
		NEXT	UPPER CLASS	LOWER CLASS



FIG.60



09195604, 111990

[illegible]

FIG.62A

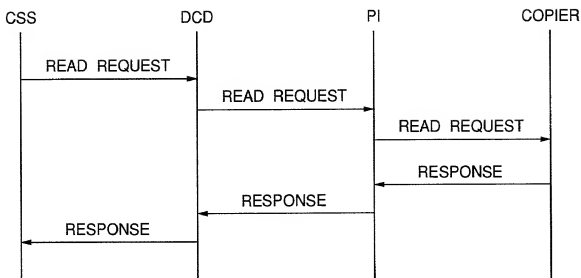


FIG.62B

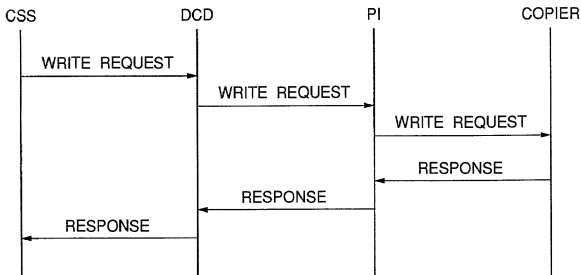


FIG.63

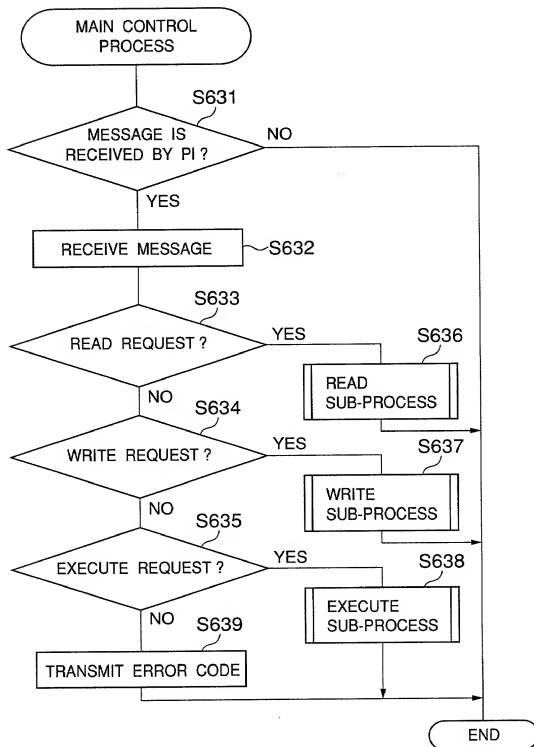


FIG.64

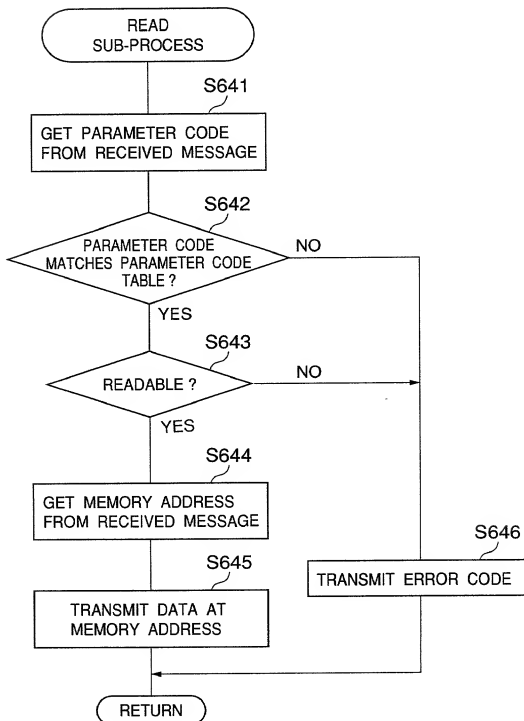
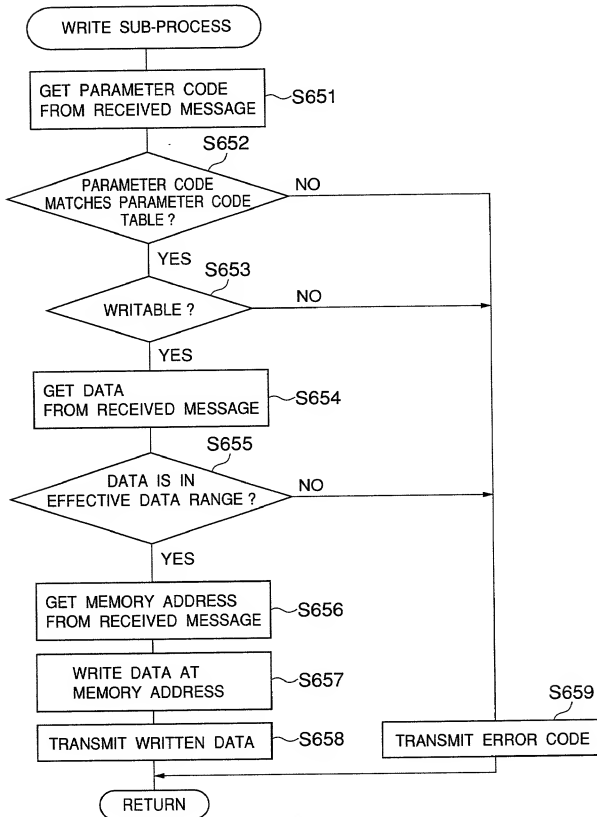


FIG.65



09195604-111998

FIG.66

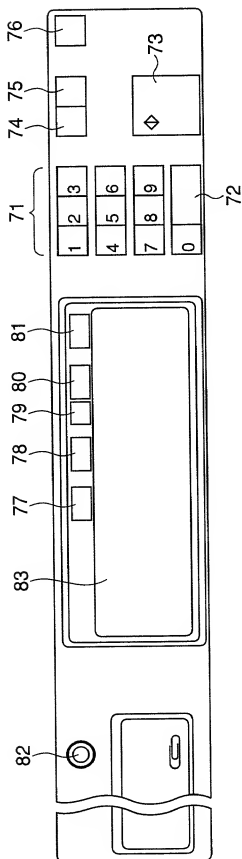


FIG. 67

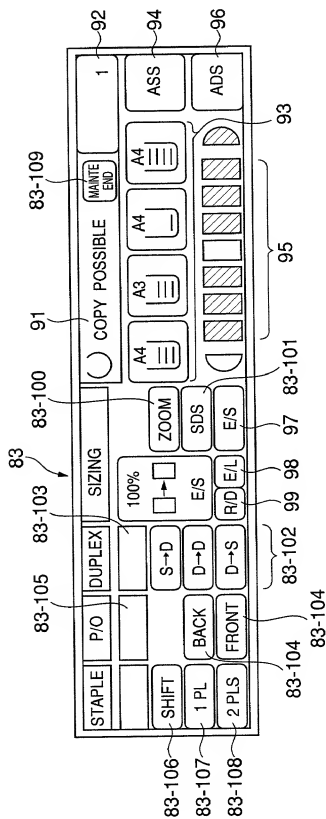




FIG. 68

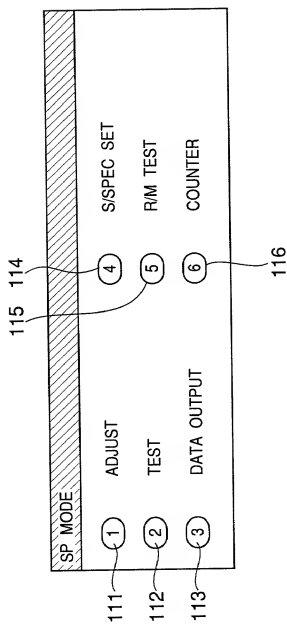


FIG.69

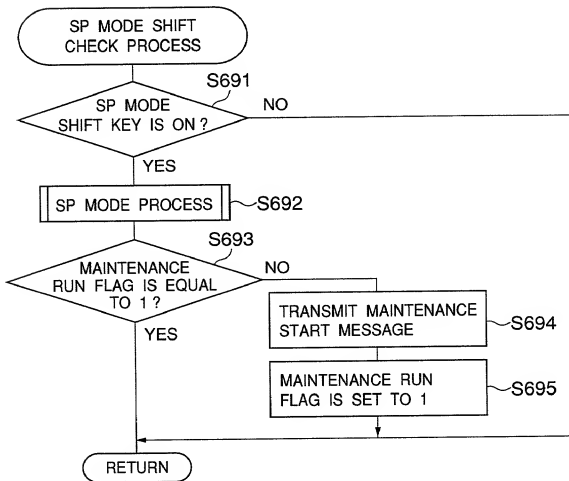
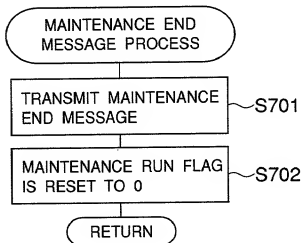


FIG.70



866TTT-40956160

FIG.71

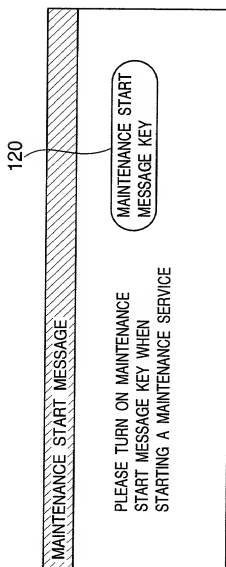


FIG.72

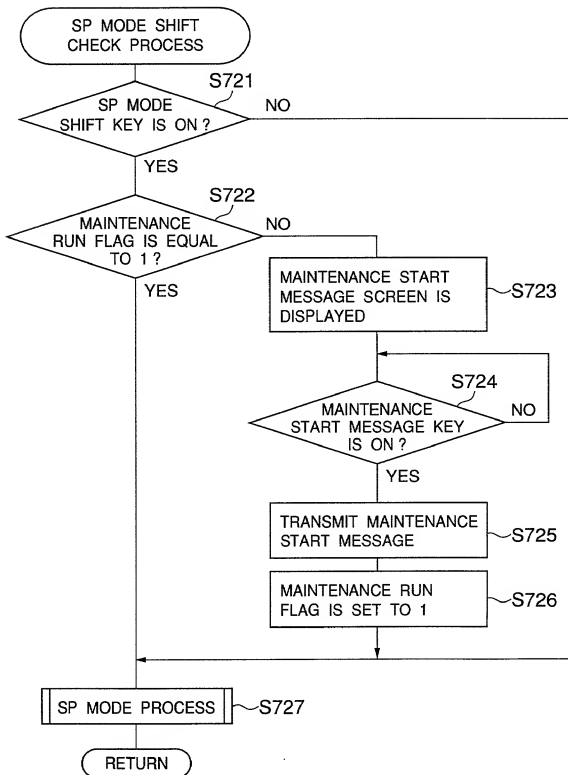


FIG.73

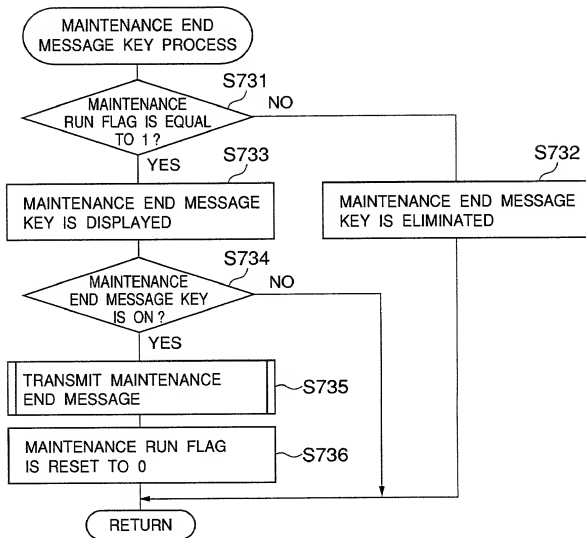


FIG.74A

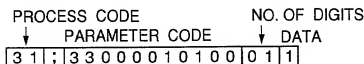


FIG.74B

